

THE IRON AGE

Established 1855

New York, January 8, 1914

Vol. 93: No. 2

Forty Carbon Steel for Castings

Its Use in Locomotive Engine
Frames—Its Properties Discussed
and Substitutes Recommended

BY EDWIN F. CONE

Not many years ago, possibly 20, the designers of locomotive engines specified wrought iron for the main frames and were decidedly opposed to steel castings. Gradually the availability and reliability of cast steel frames became recognized, until at present it is rare to find anything else in use. When cast steel was first incorporated in frames there was but one grade considered and the composition was always specified as "ordinary carbon," which meant a carbon content of 0.22 to 0.30 per cent., with a tensile strength of 60,000 to 70,000 lb. per sq. in. Within the past five years attempts have been made to introduce other grades of steel of higher physical properties, due partly to the increased demands upon the frames in service because of the building of heavier and heavier locomotives. As the increase in the capacity and weight of cars has demanded a steel instead of a cast-iron wheel,

so the greater superstructure of this larger locomotive is necessitating, in the opinion of some railroad men, a stronger metal in the frames. To meet this new demand two grades of steel have been recommended, one of which, vanadium cast steel, has met with considerable success and is being used quite extensively in the building of many of the larger locomotives. The other, which has met with some favor and which is perhaps partly in its experimental stage so far as frames are concerned, is known as "forty carbon steel" with a carbon content of about 0.38 to 0.42 per cent. A prominent Eastern steel foundry has been the pioneer in the advocacy of this grade of metal, and as a result several of the railroads have incorporated frames of this com-

position in some of their locomotives. It has been claimed that this grade, when properly annealed, is not only superior in strength and physical properties to the lower carbon, but is equal to vanadium cast steel in every respect and of course considerably cheaper.

PRECAUTIONS REQUIRED IN MANUFACTURE

The only difference between the manufacture of forty-carbon and ordinary carbon steel for steel

castings is in producing the proper carbon content, the other constituents remaining the same. It is decidedly necessary, however, to exercise great care in the finishing operations in the furnace, so as to have as quiet a metal as possible, because the tendency of steel for castings of a higher carbon content than 0.25 to 0.30 per cent. is to be active or wild when poured—more so than

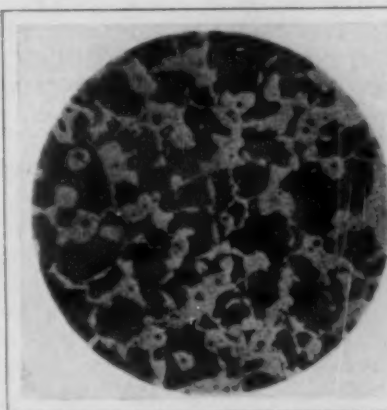


Fig. 1—Steel Cast Under Moderate Pressure, Annealed.

Chemical Composition: C., 0.45; Mn., 0.69; Si., 0.263; S., 0.045; Ph., 0.033 per cent.

Physical Properties: Tensile Strength, 87,000 lb. per sq. in.; Elastic Limit, 45,000 lb. per sq. in.; Elongation in 2 in., 20 per cent.; Reduction of Area, 27.5 per cent.

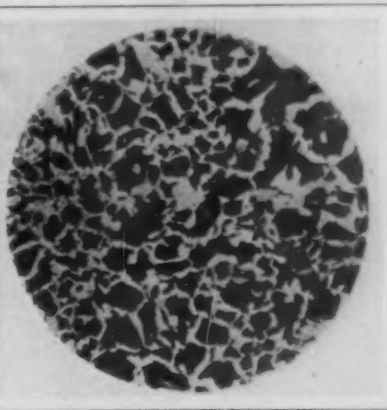


Fig. 2—Steel Cast Under Heavy Pressure, Annealed.

Chemical Composition: C., 0.44; Mn., 0.63; Si., 0.348; S., 0.041; P., 0.036 per cent.

Physical Properties: Tensile strength, 94,000 lb. per sq. in.; Elastic Limit, 51,000 lb. per sq. in.; Elongation in 2 in., 19 per cent.; Reduction of Area, 27.5 per cent.

PHOTOMICROGRAPHS REDUCED ABOUT ONE-THIRD FROM AN ORIGINAL DIAMETER OF EIGHTY-SEVEN

with the milder grade. Such a condition often results in castings that are more or less "blowy" or porous, due to the fixation of the gases during the cooling in the molds and a consequent rejection of the castings on machining, as well as an inherent structural weakness. The percentage of rejection for this cause is invariably higher for forty-carbon than ordinary carbon castings. Several remedies for this have been suggested and tried, but none with any great degree of success. A careful melter, exercising good judgment and not working for tonnage, is the best insurance against defective material so far as the metal is concerned. Even with these precautions, the chances of obtaining solid metal are not as good as in the case of ordinary carbon.

PHYSICAL PROPERTIES UNDER THREE CONDITIONS

The physical properties shown by forty-carbon steel for castings will depend on the location of the coupon and the character of the casting, other things being equal. This is true also of any other steel incorporated in castings. Illustrative of this, and at the same time showing the general physical properties of this higher carbon metal, the following results are presented. They cover tests from three different casting conditions: 1. Coupons under moderate pressure—from engine frames. 2. Coupons under heavy pressure—from the bottom of heavy ingots. 3. Coupons free from pressure. They were all made from metal poured in still another large Eastern steel foundry, a competitor of the one cited as being the pioneer in this grade of metal.

Coupons Under Moderate Pressure.—The average test coupon on a casting is usually located so that it will receive at least a fair degree of the pressure of the metal in the mold, if it is not possible so to locate it that it will receive the total pressure. The best practice of to-day is to cast the coupon solid on the casting wherever possible and not to gate it on. On locomotive frames, if a coupon is used, it is placed solid on the side of the casting flush with the top or at the parting of the mold. To place it on the under side is often impossible, since it interferes with the straightening of the frame on the table of a steam hammer. In many cases one of the tiepieces, located between the pedestals of the frames, is used for testing, and when solid often gives surprisingly good physical results, frequently better than a regular coupon from the same casting.

In the case of forty-carbon steel, as incorporated in the average locomotive frame, the coupons being located on the side where the pressure of the metal is moderate, the following results are a fair criterion of the merits of this metal. They are the average of 51 annealed tests made on as many locomotive frames in which this grade of metal from an acid open hearth furnace was incorporated:

	Tensile strength, lb. per sq. in.	Elastic limit, lb. per sq. in.	Elongation in 2 in., per cent.	Reduction of area, per cent.	Elastic ratio, per cent.
Average of 51 tests.....	82,370	41,910	21.35	34.03	50.88
Of which the best was..	85,000	42,000	24.00	34.07	49.41
And the poorest was....	84,500	42,500	19.00	25.80	50.30

The annealing practice employed was that of slow cooling in the closed annealer after proper soaking at just above the recalcence point.

Coupons Under Heavy Pressure.—The same foundry referred to in the case of the locomotive frames, poured a series of forty-carbon 50-ton ingots, fluted and bottom poured in a sand mold. On the bottom of each of these ingots the regulation test coupon was located, receiving the direct effect of the weight of the metal. These test coupons were detached and annealed in the regular annealer along with the engine frames, thus receiving the normal annealing practice. The results of the physical and chemical tests made from these annealed coupons are shown in Table 1.

Coupons Free from Pressure.—There are two conditions under which coupons may be cast virtually free from pressure. They may be attached to a light casting or they may be cast independent of any casting, as in a series attached to a central runner. It is the latter case that is considered here. A series of forty-carbon test coupons, identical in size with those regularly attached to a locomotive frame, having dimensions of 8 in. x 3 in. x 1 in. thick, were cast slightly gated to a central runner about 1½ in. in thickness, vertical or cast on end, insuring a com-

paratively solid bar, but one free from even moderate pressure such as existed in the two previous

Table 1.—Annealed Physical Tests from 50-ton Ingots

Ingot No.	Tensile str., lb.	Elastic limit, lb.	Elong. in 2 in., per cent.	Red. of area, per cent.	Per cent.				
					C.	Mn.	Si.	S.	P.
1....	80,000	43,500	21.50	32.50	.42	.02	.352	.041	.036
2....	85,200	42,600	21.50	30.00	.36	.67	.309	.040	.034
3....	84,600	47,600	20.00	28.50	.40	.64	.270	.042	.035
4....	79,000	41,000	23.50	32.50	.36	.69	.356	.038	.028
5....	78,500	41,000	22.00	27.50	.44	.63	.348	.041	.036
6....	75,500	42,500	23.50	27.50	.33	.62	.261	.041	.036
7....	78,500	40,000	25.00	40.30	.33	.59	.270	.043	.033
8....	78,000	42,000	24.50	37.20	.37	.60	.260	.038	.031
9....	77,000	42,500	24.00	37.20	.34	.57	.321	.038	.035
	75,000	38,000	21.50	34.10					
	75,500	38,500	22.00	32.50					

cases. These coupons were all placed in various parts of the large annealer in which locomotive frames were annealed and were subjected to the same heat treatment. Physical tests made from these 27 coupons gave the following average results:

	T. S., lb. per sq. in.	E. L., lb. per sq. in.	Elong. in 2 in., per cent.	Reduc. of area, per cent.
Ave. of 27 tests	80370	41380	24.0	37.03
of which the best was	79000	40500	28.5	40.3
and the poorest	81000	41000	23.0	32.5

The composition of this material was as follows:

Carbon, per cent.	Manganese, per cent.	Silicon, per cent.	Sulphur, per cent.	Phosphorus, per cent.
0.38	0.62	0.282	0.039	0.032

A recapitulation of the general averages of the three series of tests follows:

Tests	T. S., lb. per sq. in.	E. L., lb. per sq. in.	Elong. in 2 in., per cent.	Reduc. of area, per cent.	Elastic ratio, per cent.
1. Frames...51	82370	41910	21.35	34.03	50.88
2. Ingots...18	80444	43480	22.33	32.31	54.05
3. Coupons...27	80370	41380	24.00	37.03	51.42
Average of...96	81061	42257	22.56	34.45	52.13

THE EFFECT OF THE PRESSURE OF METAL

Collectively or separately these physical results are splendid and are typical of the forty-carbon steel that can be incorporated in annealed, slowly cooled castings, made of acid open hearth steel. In comparing the three classes it is seen that the coupons cast under heavy pressure give better physical properties than those from locomotive frames where the pressure is moderate, and that in particular the elastic ratio is the highest of the three conditions, due no doubt to the effect of the pressure. This was illustrated in the case of nickel cast steel in an article by the writer which appeared in *The Iron Age* of August 8, 1912. It is rather surprising, however, that the finest tests are obtained from the coupons cast under conditions practically free from pressure. While such conditions are not met with in actual practice, they are of value metallurgically and can be explained as due to certain conditions of initial microstructure—conditions which always give rise to superior static results in steel foundry metallurgy, no matter in what grade of carbon cast steel. The effect of this pressure is shown microscopically in Fig. 2, which is a section from a coupon from one of the ingots, while the contrast is shown in Fig. 1, which is a section from one of the engine frame coupons referred to.

The results of 20 dynamic tests on a Landgraf-Turner machine, made from some of the metal incorporated in the 51 frames, were as follows:

	Carbon per cent	Manganese per cent
Heat 1—2465 alternating impacts	0.37	0.69
Heat 2—2648 alternating impacts.....	0.41	0.70
Heat 3—2658 alternating impacts	0.39	0.63
Av. of 20 tests—2590 alternating impacts.	0.39	0.67

Previous tests made on ordinary or low carbon steel from locomotive frames gave 2364 alternating impacts as an average of 45 tests. This would seem to indicate a superiority of the forty-carbon steel dynamically, which is rather surprising. In fact, the writer has invariably found that, in the limited number of dynamic tests that he has made on a Landgraf-Turner machine the forty-carbon steel has always given the best results, even as high an average as 3130 impacts having been obtained in one series. In these tests the conditions of casting, location of coupons and heat treatment were practically the same.

SUBSTITUTES FOR FORTY-CARBON STEEL

Judged by its static and dynamic properties, forty-carbon cast steel is superior to ordinary carbon cast steel, whether incorporated in locomotive frames or other castings. The greatest objection to it is the tendency to porosity, resulting in a rejection of castings after machining. In the case of locomotive frames experience has shown that rejections from this cause are from 6 to 8 per cent. greater in the higher carbon than in the lower. This is apparently unavoidable, for no known remedy has been found for the tendency to sponginess, though many have been tried, including aluminum and the new ferro alloys. Without doubt vanadium cast steel meets to some extent the increased demands for strength, but if neither this nor 40-carbon steel is found desirable there are two other steels that can meet these conditions. They are nickel cast steel and a special composition steel, the latter being ordinary carbon steel with a high manganese content. The advantage of these over 40-carbon steel is that the high tensile and other properties are secured without the presence of blowholes and other defects. Even greater ductility is obtainable for the same tensile strength. Table 2 shows the various grades of acid open-hearth cast steel, their composition and physical properties after annealing, based on results obtained in actual practice. If the present demands of service require metal of higher tensile strength than 70,000 lb. per sq. in., any one of the other four grades can be employed. Vanadium, as already stated, has met with considerable success, but is considered by some to be even yet in its experimental stage. Its value depends on its proper heat treatment, which is vital. Without doubt 40-carbon steel is still regarded as an experiment, so far as its use in locomotive engine frames is concerned. Recent information is to the effect that while the demand for vanadium steel frames has not lessened, that for the 40-carbon frames has, while failures of the latter have been too many. So far as known nickel cast steel frames have never been tried, though they are no more expensive than vanadium frames when their value as scrap is considered. As to static and dynamic properties there is very little choice between the two and the danger from poor heat treatment is less in the case of nickel steel. If a less expensive metal is desired, grade 5 (Table 2), of special composition can be procured, which will meet most of the ex-

acting requirements of modern development and be equal to 40-carbon steel with some special advantages. Forty-carbon steel may go into molds in an unfinished state, reactions still going on as it cools. This is not true of other grades properly made.

The railroads and other consumers are looking for a stronger steel for castings for certain purposes. One prominent railroad is experimenting quite extensively with the special heat treatment of various grades of steel in its locomotive frames. This special heat treatment is not likely to be a success. The strains that will be set up, because of uneven sections, from quick cooling, quenching, etc., are bound to be detrimental. High carbon steel, even with its possible superior dynamic properties, cannot be as serviceable, weakened as it often is by large and small gas holes, etc. The results of the trials of this steel by the railroads and the navy, which has recently incorporated it in stern frames and stems of battleships, cannot be known for some time and will be awaited with much interest. The question of higher tensile strength in castings can be easily solved with no uncertainty as to results and efficiency by the adoption of nickel cast steel or of the special composition carbon steel here suggested.

Starrett Company's Profit-Sharing Plan

The L. S. Starrett Company, Athol, Mass., has notified its employees that, at the meeting of the board of directors held December 10, a vote was passed similar to that of last year, that the company should pay as soon after Jan. 1 as practicable to each person in the employ of the company on that date a sum equal to 2 per cent. of the entire amount of wages paid to such employee during the year 1913. The company states that this is done notwithstanding the decrease in business the latter part of the year because of the general depression throughout the country, although fortunately it did not feel the effects of the depression nearly so much as many others, especially those in the machine tool line. In fact, in spite of somewhat decreased sales, the company has not been able to bring its stock of goods on hand up to the condition that it should be to meet the heavy demands which it is confident the early spring trade will bring.

The company further states that the continued harmony and co-operation between all parts of its organization are very gratifying; that the idea is becoming more firmly rooted in the mind of each employee that Starrett tools must be right and that every one has his part to do in making and keeping them right; that economy in production and elimination of waste of material, time and labor are to be constantly striven for, but that the one great essential in the make of Starrett tools is quality.

The Ohio Valley Enamel Company, whose new plant is nearing completion at Huntington, W. Va., has received a \$40,000 order to manufacture automobile license tags for the State of Pennsylvania. A number of other large orders for making metallic enamel signs have been received.

Table 2.—Typical Grades of Annealed Acid Open-Hearth Steel Castings

	1. Ordinary Carbon.	2. Forty Carbon	3. Vanadium.	4. Nickel.	5. Special Composition
Carbon, per cent.....	0.22 to 0.30	0.38 to 0.42	0.20 to 0.25	0.25 to 0.35	0.28 to 0.35
Manganese, per cent.....	0.60 to 0.65	0.60 to 0.65	0.55 to 0.60	0.60 to 0.65	0.70 to 0.85
Silicon, per cent.....	0.25 to 0.28	0.25 to 0.28	0.25 to 0.28	0.25 to 0.28	0.25 to 0.28
Sulphur and Phosphorus, per cent.....	0.030 to 0.045	0.030 to 0.045	0.030 to 0.045	0.030 to 0.045	0.030 to 0.045
Vanadium, per cent.....			0.16 to 0.20		
Nickel, per cent.....				3 to 3.50	
T. S., lb. per sq. in.....	60,000 to 70,000	80,000 to 90,000	63,000 to 75,000	80,000 to 110,000	75,000 to 90,000
Elastic limit, lb. per sq. in.....	30,000 to 35,000	40,000 to 45,000	33,000 to 45,000	47,000 to 60,000	38,000 to 45,000
Elongation in 2 in., per cent.....	25 to 35	15 to 22	20 to 25	18 to 25	22 to 30
Reduction of area, per cent.....	40 to 50	25 to 35	35 to 50	30 to 40	30 to 40
Elastic ratio, per cent.....	50	50	60	58 to 60	50

STEEL CASTINGS DIRECT FROM IRON ORE

A Novel Canadian Electric Furnace Producing Excellent Results

The announcement was recently made of the incorporation of the Moffat-Irving Steel Works, Ltd., at Toronto, Canada. The object of the promoters of this company has been the electro thermic reduction of iron ores and their direct refining to steel. The experiments upon which the establishment of this new venture is based have extended over a number of years and have been extremely thorough. One of the incentives to this undertaking has been the desire to find a method by which Canadian iron ores could be economically handled since they are not suitable for smelting in the ordinary blast furnace without concentrating and briquetting. An article in the Canadian Engineer for October 23, 1913, gives some of the details of the operations of this company which is now successfully manufacturing steel castings by this new process.

The form of the furnace which is being used is based on the principle of the electric pig-iron furnaces of Sweden and is shown in diagrammatic elevation in Fig. 1, while the furnace itself is illustrated in Fig. 2. The crucible is built on a substantial base of concrete. Above this there are a few courses of hard-burnt red brick, and finally the silica brick forming the main body of the crucible. The hearth is of rammed magnesite furnishing a basic lining. The particles of ore are fed into the upper stack by

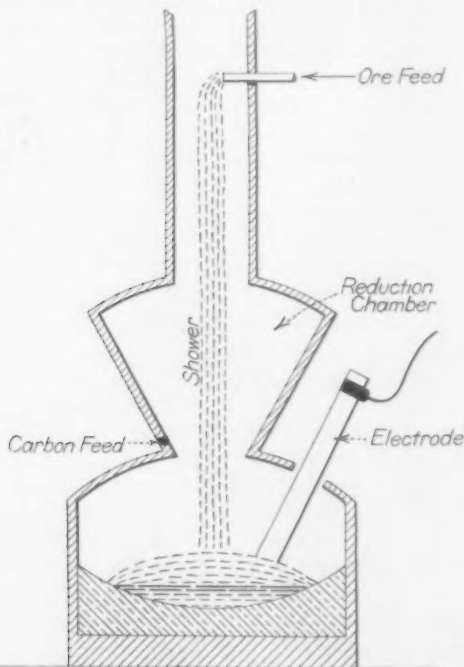


Fig. 1—Sectional View of Electric Furnace

a mechanical screw feed and the necessary lime stone is also fed in at the same level. The carbon as finely ground coke is injected similarly at the top of the crucible. The three electrodes, the current being three-phase, are projected into the crucible at an angle of about 60 deg., one only being shown in the illustration. The ore particles in falling come in contact with a strongly reducing hot atmosphere of carbon monoxide gas, being partly reduced thereby. Final reduction takes place in the crucible.

A grade of steel from this furnace is being incorporated into castings which is claimed to be

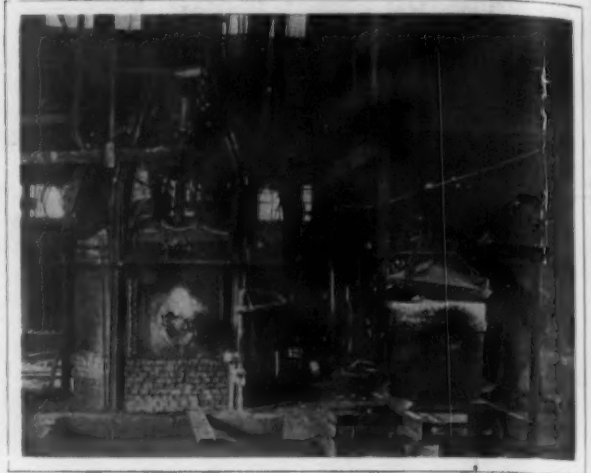


Fig. 2—Electric Furnace and Ladle Dryer

equal in every respect to the best crucible steel or to any other electrically produced steel. The average analysis of three heats is reported as carbon 0.27 per cent.; manganese 0.74 per cent.; silicon 0.27 per cent.; sulphur 0.010 per cent. and phosphorus 0.031 per cent. Physical tests are said to be above the average and the appearance and quality of the castings to leave almost nothing to be desired.

The company claims that the problem of handling Canadian ores has been solved by this process. It is the only furnace in existence that is commercially producing steel for castings direct from the ore.

A New Binder for Ore Briquettes

A discovery has been made by Otto Kippe, Osnabrück, Germany, that a certain special kind of dust derived from blast-furnace gases, known as filter dust, is capable of developing unusual capacity as a binder, particularly for ore briquettes, when treated with steam under pressure. A patent (1,078,544) has been granted to him on a process of making briquettes based on this discovery. The filter dust referred to is the material which is caught by the filters in blast-furnace practice, in which the solid particles are eliminated by means of what is known as the dry process as distinguished from the wet; after the flue dust proper has settled out of the gases, the latter are passed through wet catchers in which the remaining dust settles as a mud or slime. It is so fine that it floats along with the furnace gases without being separated from them when the flue dust is precipitated. It is found to contain: SiO_2 , 29 per cent.; Al_2O_3 , 20 per cent.; CaO , 27 per cent. and Fe , 4 per cent., while flue dust is essentially iron and carbon. Heretofore this filter dust has been considered practically useless and its removal a source of expense. But its faculty of causing cohesion is astonishing. Fine ore, mixed with this dry filter dust without any special treatment, produces briquettes of great rigidity and firmness when treated with steam under pressure. As low as 5 to 10 per cent. of this material as a binder produces briquettes that satisfy all the requirements of blast-furnace operation.

Fairbanks, Morse & Co. have established warehouses at 17 South Hanover street, Baltimore, Md., where they will carry a stock of their line of gasoline and kerosene engines, pumping machinery and electric motors and generators. The branch is under the management of Edwin S. Denise.

An 84-In. Reversible Planing Machine

A new type of 84-in. reversible motor-driven planing machine, which in spite of its size is said to be as easy to operate as any of the smaller machines, has been placed on the market by the Cincinnati Planer Company, Cincinnati, Ohio. The machine has rapid power traverse to all the heads in any direction. All the movements are independent of each other and can be operated irrespective of whether the table is in motion or not. The motor, mounted on top of the housing, is used in four different ways, supplying power for driving the rapid power traverse and feed to the heads for elevating and lowering the cross rail and for driving the pump which lubricates the ways.

The pinion on the motor armature meshes with a large gear on the horizontal rapid traverse shaft, which transmits power to the pinion that drives the feed clutch. A gear located at approximately the center of this horizontal shaft meshes with a pinion on the gear case of the elevating device, the power for raising and lowering the cross rail being transmitted in this way. For convenience in operation, a lever controlling the elevating and lowering clutches in the gear case extends to the left side of the machine.

The power feed of the tool heads receives its power from the driving clutch, which has a bell crank and link motion to the bevel gear on the large horizontal shaft. This gear meshes with one on the vertical shaft and the power is transmitted thence through a set of spur gears to the trigger gears on the end of the rail and side heads. The driving clutch is tripped by a rod receiving its motion from the tumbler and dogs on the side of the table and bed. Graduated slot heads which indicate the exact amount of feed at all times enable the feed to be varied at will. The rapid power traverse is driven from a second vertical shaft on the side of the housing, the arrangement being very similar to that of the feed. The small handles at the end of the rail and side heads operate the rapid power traverse and feed, motion to the left

engaging the rapid traverse, while by turning the handles to the right, the regular feed is engaged. It is impossible to engage both at the same time. For reversing the direction of the rapid traverse, the handle at the lower end of the rail is employed, this entire mechanism being contained in the gear case at the end of the rail, so that it is unnecessary for the operator to leave his regular position at any time to make any of the changes.

The bed is of the four-wall type and is braced in that portion which contains the gears. Holes are bored to receive the driving shaft boxes, which are of large diameter and have special lubricating arrangements. Steel is employed for the driving gears and the pinions and table rack are steel forgings. The table is of box section and is heavily ribbed throughout, the top and the bottom being especially thick. The ways in the bed upon which the table runs are oiled by forced lubrication from a pump at the back of the housing.

As can be seen from the engraving, the housings are of massive box form and are tongued and doweled to the side of the bed. As an additional precaution they are fastened at the top by a box section arch which is open only at the ends where it fastens against the housings. The heads are taper gibbed throughout and the clapper boxes are fastened by a heavy clamp and three screws instead of two bolts passing through a cored slot.

The driving motor is connected directly to the driving shaft through a flexible coupling and the controller is mounted on the housing. With this arrangement it is possible to secure ten cutting and the same number of return speeds.

Stone Roof for Modern Foundry

A notable feature of the new South works, or foundry, of the J. I. Case Threshing Machine Company, Racine, Wis., described in *The Iron Age* of October 9, 1913, is the roofing. This is made of asbestos and Trinidad Lake asphalt, two of the most enduring mineral substances in existence. The asbestos is made into a felt, layers of which are cemented together with the asphalt. The combination of these two materials produces a roofing that is literally a sheet of pliable stone.

Because of its all-mineral composition, this roofing can not rot, rust nor deteriorate, hence it never requires painting or any other form of coating. It is also said that this roofing is proof against the action of chemical fumes, and that sparks and burning brands have no effect on it. Hundreds of cases are on record in which it has for years withstood a continuous shower of sparks from stacks and cupolas. The H. W. Johns-Manville Company, New York City, the manufacturer of this roofing, claims that it is the cheapest on the market, on the cost-per-year basis, on account of its comparatively low first cost and the fact that it never needs coating. It is known as J-M asbestos roofing and is furnished in rolls or sheets, ready to lay, or in built-up form. Its application involves no special difficulties.



Partial View of a Large Reversible Motor-Driven Planing Machine

UNIVERSAL TOOLROOM LATHE

A Selective Head Tool Swinging 18½ In. and Equipped With Various Attachments

A universal selective head lathe for single-pulley belt or motor drive, designed especially for use in toolrooms, has been brought out by the Lodge & Shipley Machine Tool Company, Cincinnati, Ohio. It possesses a number of refinements and attachments not required on lathes employed for general manufacturing work. The lathe can be furnished with either four or five step cone pulleys, single back geared drive or a three-step cone pulley, double back geared drive. In one of the accompanying engravings the selective head type is shown with complete additional equipment.

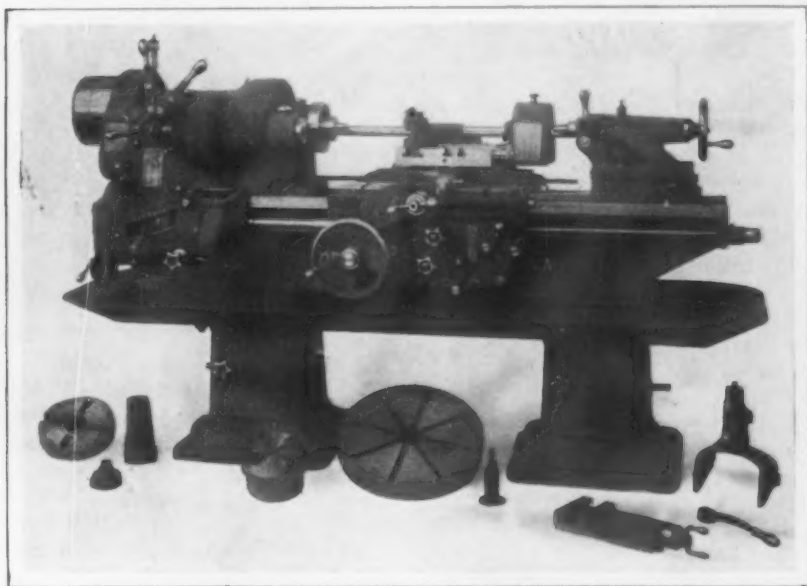
The selective head, which was illustrated in *The Iron Age*, June 26, 1913, enables 12 changes of spindle speed to be obtained through conveniently located shifting levers. The head receives its name from the selective type of transmission used in the

sorb the vibration from the cutting tool is provided for the bridge. A large self-locking micrometer dial is provided for the cross feed screw. The carriages are planed and drilled to receive either the plain or universal taper attachment and the relieving attachment, and no additional fitting is required when applying these parts. The top slide of the compound rest has a large self-locking micrometer dial. It is designed so that the extreme width of the swivel rests directly upon the lower slide, avoiding overhang of the top slide.

The quick return mechanism for the carriage when screw cutting is being done is of a new design. The reverse is by friction and is controlled by the movement of the lever which opens the half nuts. The carriage stops when this lever is raised and the nuts disengage, and by moving the lever slightly higher, the quick return mechanism is engaged and the carriage returns four times as rapidly as the speed at which the thread is being chased. A new design of chasing dial, A, having a hardened, notched disk mounted on the shaft

which is secured to the worm-wheel that engages the lead screw thread, is used. Longitudinal movement is provided for the disk and any selected index may be engaged with the stop dog, which prevents the half nuts from becoming engaged until the proper notch in the disk is presented to the dog. In this way it is pointed out that the half nuts are prevented from clamping on top of the threads, and it is unnecessary for the operator to watch the dial. The automatic chasing stop B, which is attached to the dovetail of the carriage by a clamping screw is directly connected to the lower slide of the compound rest. The function of this stop is to insure the same depth of cut being taken over the thread. When this device is being used it is claimed that it is unnecessary for the operator to watch the micrometer dial, but he can chase the thread to the proper depth, the rest coming directly against the dead stop at all times. The chasing stop prevents breakage of the tool point and with the quick return reduces chasing to a very simple operation.

The quick change screw cutting and feeding attachment is bolted to a planed pad on the front of the bed underneath the headstock. The sliding tumbler is supported in a slide independent of the shaft bearings and close to the handle that moves it within the slot, this arrangement avoiding overhang of the handle and being relied upon to prevent binding and cramping when setting. Power is transmitted from the feed gear on the end of the spindle through a reverse plate to the stud of the headstock and then through a quadrant mounted on the end of the gear box, three changes being obtained in this way. As 30 changes are provided by the gear box, it is possible in conjunction with the quadrant to obtain 90 changes all told. Before the intermediate gear can be meshed with the selective gear of the cone, the housing carrying the sliding tumbler is locked into position. The index which can be supplied for cutting either English or metric threads is attached to the top of the box, where it can be readily seen by the operator. The English threading index can be ordered with the machine



A 16-In. by 6-Ft. Selective Head Toolroom Lathe with Attachments

gear box, all of the gears being of heat treated chrome nickel steel. The main housing of the cone pulley head is carried up slightly above the center line of the spindle, giving a rigid construction and binding the front and rear spindle bearings to each other and also to the headstock. The back gearing used is designed to give a uniform progression over the entire speed range.

The spindle bearings are replaceable and are held in position by screws. The end thrust is taken by alternate hardened steel and bronze washers. A wick oiling system lubricates the spindle and back gear bearings, and oil tubes are used for those in the quick change gear mechanism and the apron.

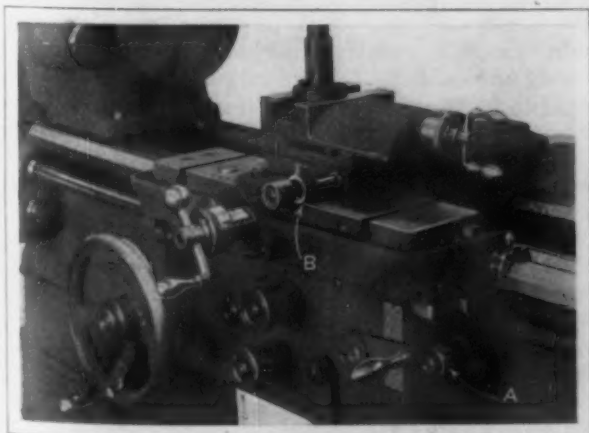
The bed is of wide and deep box section and the legs are set in from the ends. The 6-ft. bed which is the size illustrated, has three girders of the inverted U type, the space between them being the same as the width of the girders. A coarse pitch steel rack is bolted to the bed directly back of the lead screw, which is placed well up under the front V of the carriage.

The carriage is gibbed at the front, back and inside and has a long bearing on the outside shears. A supplementary bearing on the inside front shear of the bed to resist the pressure of the cut and ab-

and the metric attachment can be applied subsequently without any fitting. In doing this all that is necessary is to add a gear cover, in which is mounted the translating gears. This is a duplicate of the plate regularly secured to the gear box. When the lathe is arranged for cutting metric pitches, it is also possible to cut either metric or English.

Two types of taper attachment are supplied. The bracket carrying the swivel bar of the plain attachment is bolted to travel with the carriage, so that the attachment can be instantly engaged. The slide has an extension which engages the arm that clamps it to the bed and holds it stationary when the carriage is feeding. The swivel is a steel straight edge which can be set to graduations in inches per foot. The screw telescopes through the cross feed pinion on the front of the carriage so that it is possible to use the taper attachment with a plain rest or with a relieving attachment, and the depth of cut is determined by the cross feed screw. The universal taper attachment, in addition to the parts for the plain taper attachment, has a mechanism for giving power traverse to the swivel bar of the universal taper attachment. This is controlled by a shaft extending through the bridge of the carriage and operated by change gears at the front, driven directly from the apron feed train. For handling abrupt taper work an independent driving mechanism is provided. As it is possible to feed the slide at various speeds it is capable of turning much longer tapers than with the plain attachment.

An attachment for producing radial, angular, end or inside reliefs is also furnished. Power is transmitted from the splined shaft at the back of the bed through the sleeve and change gears to a shaft below and parallel with the driving shaft. This lower shaft in the housing transmits its power through hardened spiral gears to the camshaft, which takes its bearing in the cross slide. The camshaft engages a roller mounted in a plunger, which in turn engages a bell crank that is mounted on the top slide of the relieving attachment. The abutting portion of this bell crank is adjusted by a screw and by removing the top cover various depths of relief can be secured. The swivel itself can be set at any angle without affecting the movement of the slide, and thus it is possible to relieve at any angle, inside or outside, or on the face of a piece of work. The camshaft is placed below the surface of the bridge, so that the full swing over the bridge is obtained for relieving. One of the features that is particularly emphasized about this attachment is that it is unnecessary to go behind the lathe to make adjustments.



View of the Apron Showing the Automatic Chasing Stop and Chasing Dial



The Universal Relieving Attachment

The draw-in chuck is mounted directly on the spindle nose. No draw tube passes through the spindle, which makes it possible for the collet to receive stock as large in diameter as the size of the hole through the spindle.

Electric Smelting at Hardanger, Norway

At a recent meeting of the Polytechnical Society in Christiania, Norway, the causes of the failure of the attempts to electrically smelt iron ore at the Hardanger Electric Iron and Steel Works were fully discussed. Gustaf Odqvist agreed with the electrometallurgical committee of the society that the unsatisfactory result was the outcome of several co-operating circumstances, but disagreed that the type of furnace had anything to do with it. He did not consider the type used suitable for coke as a means of reduction. In addition the ore used was too poor and a displacement of phases reduced the calculated efficiency of the furnace by one-third. In his opinion electrodes of too large a diameter were used; 800 kw. more than the average current were necessary, the variations in the current being too great. The iron produced there was from 13s. 4d. to 15s. 6d. (\$3.24 to \$3.77) more costly per ton than that produced in Sweden, where charcoal was used though this is more expensive than coke. It was demonstrated, however, that electric iron-ore smelting with coke was possible but not financially advantageous as carried out at Hardanger.

Dr. Lindermann stated that Professor Farup has recently undertaken a series of laboratory experiments, the results of which would soon be made known. They indicated that if electric iron-ore smelting were resumed at Hardanger, it would have to be worked on different lines which would insure good financial results. The experiments had demonstrated that, by small alterations in the furnace, iron could be produced with coke as a fuel which would fully vie in quality with the Swedish.

General Olesen stated that ore smelting at Tinnos had proved that very good results could be obtained from the poor ores, and that they are now going to adopt the electric production of steel there by conveying the pig iron direct from the blast furnace to the steel furnace which German experiments had shown could be done advantageously.

The Canadian Manufacturers' Association, Toronto, Canada, has issued a valuable publication, entitled "Canadian Trade Index for 1913-1915." It is a volume of 458 pages, in cloth, 7¼ x 10½ in., classifying all the manufacturers of Canada under headings denoting the articles made. The price is \$3 per copy. It will be found especially interesting by business men on this side of the border who have commercial relations with Canada.

HUMPHREY GAS PUMP TESTS

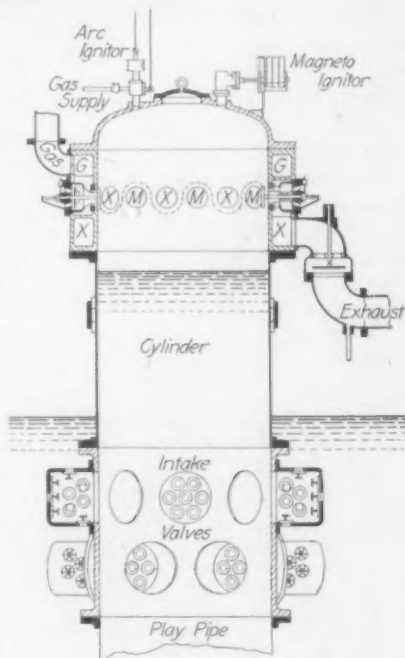
Record in Lifting Water—Direct Displacement by the Explosive Gas Combustion

One water horse-power-hour for 0.8 lb. of anthracite coal has been obtained in raising water at Chingford, Essex, England, by means of the Humphrey gas pump, a remarkable application, made by H. A. Humphrey, of the internal combustion engine cycle for the direct displacement of the liquid to be pumped by means of the gases being burned and expanded. All told five of the pumps were installed for filling a reservoir of the Metropolitan Water Board, taking the water from the River Lea, and aggregating in capacity 180,000,000 gal. per day for a lift of 25 to 30 ft. When the tenders were opened, as reported in *Engineering*, of London, February 14, 1913, it was shown that the cost of the producer gas plant and the buildings and foundations totaled about \$95,000 less than the lowest bid for a triple-expansion pumping engine plant and a guaranteed fuel consumption was offered not to exceed 1.1 lb. of anthracite coal per pump horse-power-hour, with a penalty of \$5000 for every 0.1 lb. consumption in excess of the figure. So bold was the departure from commonly accepted pumping equipment that the contract closed imposed a penalty of \$100,000 should the plant prove a failure. The official tests, extended over a considerable period, have now been completed, and the information concerning them has been taken from *Engineering*, of December 19, 1913, and a few descriptive particulars follow, obtained from the American company controlling the pump, the Humphrey Gas Pump Company, Syracuse, N. Y.

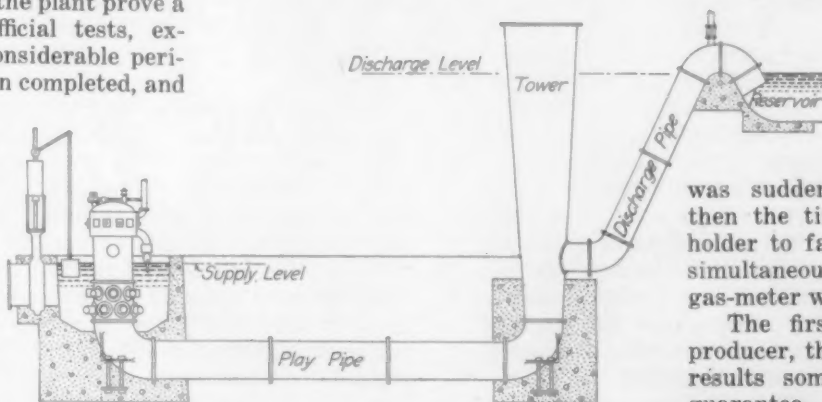
The report shows that the average fuel consumption of the four large pumps was 0.931 lb. per water horse-power-hour, while the small pump, rated at 20,000,000 gal. a day, gave the remarkable average figure of 0.8 lb. of anthracite—the general average of the whole five pumps being 0.904 lb. of anthracite per water horse-power. While each of the large pumps was specified to lift 40,000,000 gal. per day, the actual average discharge was 47,500,000 gal. per day, while the small pump, specified to lift 20,000,000 gal. a day, actually raised 26,100,000 gal. The higher efficiency and relatively larger output of the small pump is mainly attributable to the valve area provided being proportionately greater than it is in the four large pumps. The

low consumptions have been realized in spite of a low-compression pressure, which was only 20 lb. per sq. in. The maximum pressures attained on the cushion and the explosion strokes were each about 110 lb. per sq. in.

The producer plant was constructed by the Dowson & Mason Gas Plant Company, Ltd., Levenshulme, Manchester. The pumps are of the "drowned-suction four-stroke-cycle" type. Three of the Dowson producers were each to be capable of gasifying 370 lb. of anthracite per hour, and the remaining producer to be capable of gasifying 138 lb. per hour. The manufacturers of the producer plant guaranteed their producers to generate 78 cu. ft. of gas having a calorific value of 150 B.t.u. per cubic foot from 1 lb. of suitable anthracite coal.



The Combustion Chamber, Letters Indicating the Mixture and Exhaust Valves, and Suction Box Underneath



General Scheme of Pumping at Chingford, Essex, England

PRODUCER TESTS

Each producer was tested for a period of 6 hr. The height of the fire was measured at the beginning of the test, and maintained approximately constant, and in all cases the level at the end of the test was the same as at the beginning. Coal was fed into the producer about every 15 min., and the gas made was measured through a gas-meter and was burned. The meter was of the rotary type and was calibrated before and after each test against the fall of a gas-holder. The outflow of gas was controlled until the gas-holder remained approximately stationary, when the quantity passing through the

meter was equal to the gas made by the producer. Starting with the holder full, the producer was suddenly cut out, and then the time taken for the holder to fall was noted, and simultaneous readings of the gas-meter were taken.

The first test of No. 4 producer, the small unit, gave results somewhat under the guarantee, due to defective adjustment of the steam jet.

The producer was retested

with the jet readjusted and gave results approximately the same as for the larger producers. The average of these test results (excluding Test 1 of Producer No. 4) shows that 1 lb. of anthracite yields 82.1 cu. ft. of gas at a temperature of 60 deg. F., and a pressure of 30 in. of mercury, at an average calorific value of 146.3 B.t.u. per cubic foot. That is, 1 lb. of anthracite converted into gas yields 12,011 B.t.u. The fuel used under the boilers which supplied steam to the producers was estimated during each test. Ordinary good quality anthracite was used in the producers, the calorific value of which was given as 14,600 B.t.u. per pound.

PUMP TESTS

As in the case of the producers, each pump was tested for a period of 6 hr., but owing to the neces-

sity for making both gas measurements and water measurements intermittently, six complete tests were made during the 6-hr., the average of these being taken for the official figure. The time occupied by each short test was about 10 to 15 min., but, excepting once or twice when there was shortage of water, the pumps worked continuously over the test period. The accompanying table gives a summary of the pump tests.

Tests of Humphrey Pumping Plant, King George V. Reservoir, Chingford.

Pump Number	1	2	3	4	5
Number of tests	6	6	6	6	6
Average duration of tests, min.	9.27	8.95	8.37	9.67	10.0
Lift in feet	30.01	30.24	30.06	32.6	30.24
Water pumped, gals. min.	33,407	32,773	33,047	32,663	18,116
P.H.P. developed	303.9	300.4	301.1	322.7	166.0
Gas used per minute at 60 deg. F. and 30-in. mercury, cu. ft.	395.4	393.3	391.5	400.1	191.6
Calorific value of gas, B.t.u., cu. ft.	145.7	146.4	146.2	142.2	138.1
Average thermal efficiency, per cent.	22.39	22.19	22.33	24.07	26.63
Anthracite used per P.H.P. hour, lb.	0.946	0.957	0.949	0.881	0.796

THE PUMPS BRIEFLY DESCRIBED

Each pump consists of a cast-steel head into which the explosive charge is compressed and fired, a water suction-valve box from which a play-pipe leads to the base of a water-tower, built up of riveted plates. From each of these towers a 4-ft. pipe leads over the top of the reservoir embankment, and discharges into the uppermost of a series of water-cushions extending to the bottom of the reservoir. The supply of water is led along the back of the pump-house through a conduit formed in the concrete. From this a cast-iron pipe embedded in concrete is led into each of the five pump pits.

The pressure above the water surface sets in motion the whole column of water, the hot gases expanding above it. Once the column of water is set in motion its inertia carries it forward, so that the pressure of the gases in the combustion chamber ultimately falls below that of the atmosphere, and as a result the exhaust valve opens under its own weight. The forward motion of the water continuing, the level finally falls below that of the water in the supply tank, and fresh water then enters. Finally, the momentum being exhausted, the water begins to flow back along the play-pipe and, rising in the chamber, closes the exhaust valves by impact, trapping above this level a cushion of the spent gases mixed with a large proportion of air which was drawn in through a scavenger valve during the forward motion of the water.

This cushion of air is compressed into the head of the chamber by the continued return of the water column, the latter being thus finally brought to rest, in which condition the pressure of the cushion is much above that due to the static head. As a consequence the water column begins a second forward oscillation, in the course of which the pressure in the cushion space falls again below that of the atmosphere. By means of interlocking gear the exhaust valve and the scavenger valve are now prevented from opening, but a valve in the head, being simultaneously unlocked, a charge of gas and air enters the chamber. When the forward momentum of the water column is again exhausted, a return flow takes place, which compresses the new charge, and fires it automatically at the proper time, thus starting a fresh cycle of operations.

Some idea of the size of the 40,000,000-gal. pumps may be gained from the following figures: The suction box immediately underneath the combustion chamber or gas head is 7 ft. in inside diameter and 10 ft. high and the elbow joining it to

the play pipe reduces to 6 ft., the diameter of the play-pipe. The gas head has 16 exhaust valves 5 in. in diameter.

NO GERMAN INVASION IN STEEL

Leading Manufacturers' Views in Reply to the Inquiry of "The Iron Age"

The Iron Age's correspondent at Berlin, Germany, has recently asked the opinion of a number of German steel manufacturers on the possibilities of German shipments of steel products to the United States under the reduced Underwood tariff. The replies received show that there is no expectation in Germany at the present time that steel manufacturers there will secure much, if any, American trade in iron and steel because of the lowering of duties. From the headquarters of the German Steel Works Union at Düsseldorf the following official expression was received:

We cannot hope that any increase in our foreign trade will be the result of the lowering of the North American tariff, since everything depends here on the price adjustments of the very powerful American steel industry. Further, if the former tariff stipulations gave rise to considerable complaint here, then the new conditions will increase rather than lessen this state of affairs. Above all the North American steel industry, because of the easy adjustability of the freight rates of the railroads to existing conditions, is fortified against any foreign competition.

August Thyssen, the well-known head of the *Gewerkschaft Deutscher Kaiser*, writes as follows from Mülheim-Ruhr, under date of December 17:

In reply to your letter of the 15th of this month I regret to be obliged to say that the question whether the export of German steel products to the United States is possible cannot now be properly answered because sufficient figures based on experience cannot yet be assembled. Personally, however, I am of the opinion that the highly developed American steel industry, if it should be confronted with European competition, will find ways and means to equalize the tariff reductions by price adjustments and to secure business where and how it deems best.

Director Springorum, of the *Eisen und Stahlwerk Hoesch*, Dortmund, one of the best known authorities in the German iron trade, made the following reply:

I am of the opinion that the export of German steel to the United States in any considerable volume is not to be looked for. In saying this I have in mind chiefly the branches of the trade with which I am most familiar, namely, railroad material, plates, bars, wire. I am less able to judge how the case will stand with more highly manufactured products, like woven wire products, manufactures of plates, etc.; but I believe that in these products also it will not be possible to compete with American goods in the American market.

The Cincinnati Iron & Steel Company, Cincinnati, Ohio, held its annual dinner and sales meeting at the Metropole Hotel, in that city, on the evening of December 29. The business of the past year was gone over and plans for the future were mapped out. President James I. Stephenson was toastmaster. Others present were H. C. Busch, vice-president; J. A. Sebastiani, secretary and treasurer, and the following employees and guests: G. M. Horton, C. L. Hudson, J. N. Stallman, O. Ketterlinus, T. A. Sebastiani, C. Hattersley, J. S. Fouche, O. J. Cosgrave, R. A. King, W. E. Greenwald, A. J. Sebastiani, W. S. Hosty and C. A. Koppenhoefer.

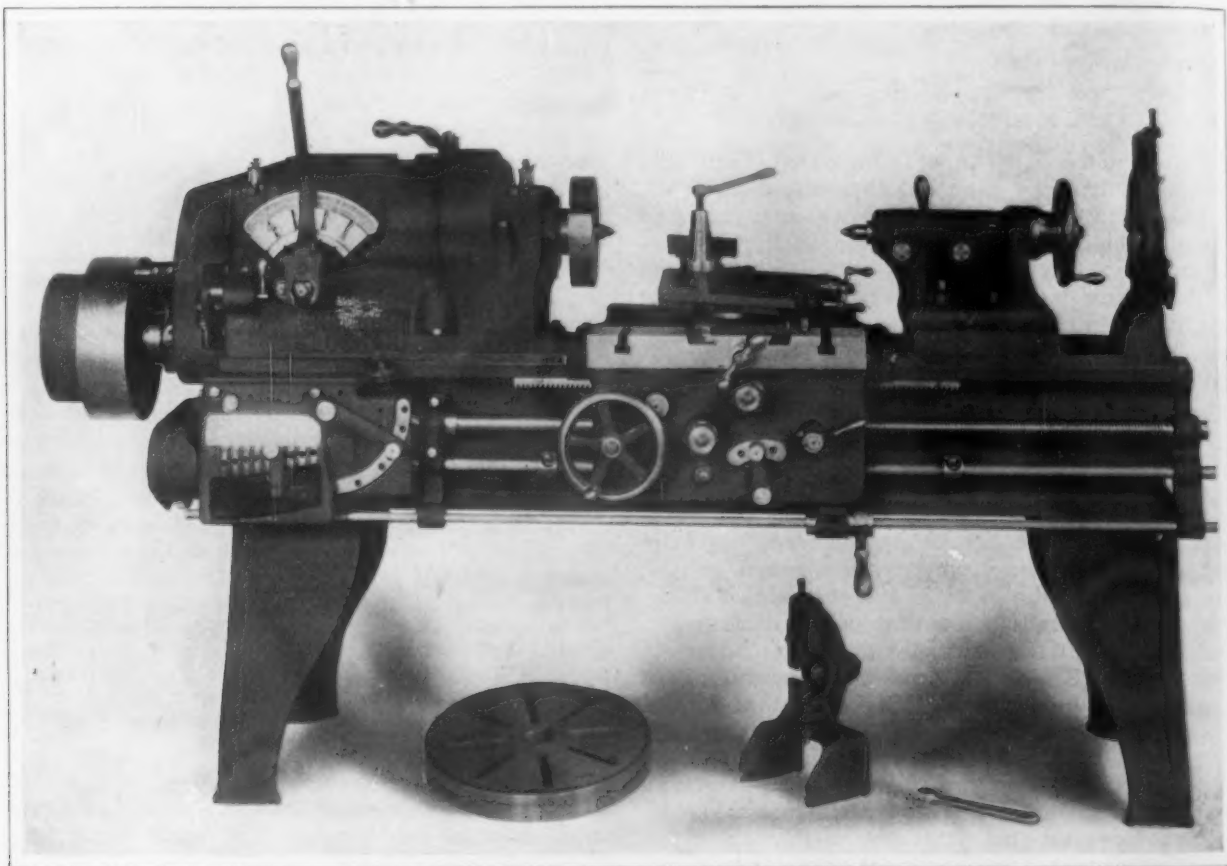
A 17-IN. GEARED HEAD LATHE

Recently Developed Quick Change Tool Having Single Pulley Motor Drive

The use of sliding gears to obtain all the speed changes instead of frictions and a compact motor drive which does not require any additional floor space are the special features characterizing a new 17-in. quick change lathe with single pulley drive that has been brought out by Greaves, Klusman & Co., Cincinnati, Ohio. A front view of the tool and an end view, showing the arrangement of the driving motor are presented herewith.

The gear arrangement employed is similar to the sliding gear transmission of an automobile, with the exception that a single lever is employed

treated steel gears which are driven by a constant-speed friction clutch pulley. The drive for the spindle is adjacent to the front bearing, an arrangement which is relied upon to eliminate any vibration or torsional strain to the spindle. The arrangement of the gearing is such that only the gears required for any one speed are engaged and no idle revolving gears add to the frictional load. The initial drive shaft transmits power through gears to a driven shaft, having a cone of five gears mounted on it. From here, the power is transmitted to a second driven shaft, which has a cone of three sliding gears engaging with three of the cone gears on the first driven shaft. A positive stepped clutch is formed on one end of the three sliding gears and by sliding these three cone gears along their shaft, they connect with a spring ten-



A New 17-In. Quick Change Geared Head Lathe with a Single-Pulley Drive

to change the speed and engage the friction clutch drive pulley instead of the two used in automobiles. Before any speed changes can be made, it is necessary for the operator to engage the friction clutch, which, it is pointed out, relieves the gearing of all strain and permits it to slide freely and without any shock or jar. It is possible to obtain 10 spindle speeds without stopping the lathe, by moving the vertical lever on the headstock to the right or left in the notches which are marked, while pulling it in or out engages or disengages the friction clutch drive pulley to start or stop the spindle. It is pointed out that the action of this vertical lever is self-locking and, in conjunction with the notched segment and direct reading index plate, forms a convenient control. The back gears are thrown in or out of engagement by the horizontal lever at the top of the headstock, while by placing it in its neutral position the spindle is entirely disengaged and can be revolved by hand for chucking work, etc.

The power is transmitted through hardened heat

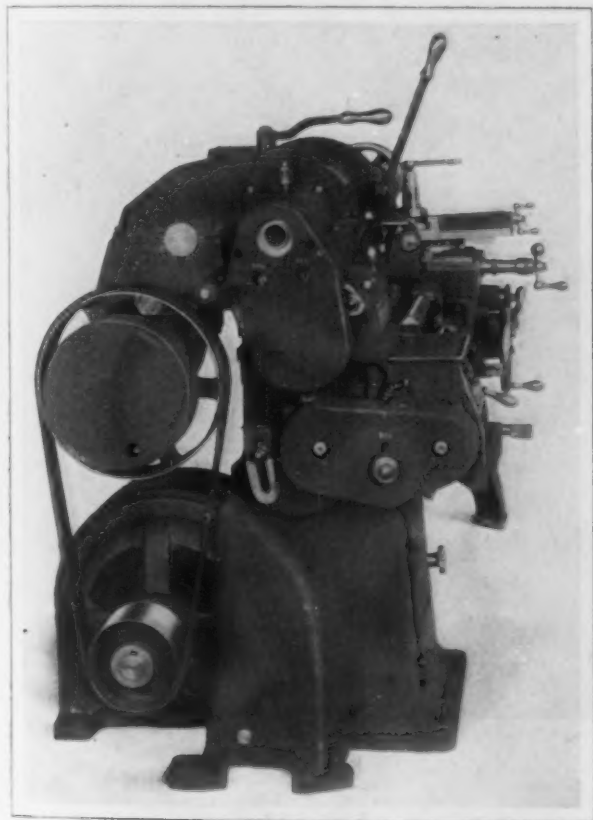
treated steel gears which are driven by a constant-speed friction clutch pulley. The drive for the spindle is adjacent to the front bearing, an arrangement which is relied upon to eliminate any vibration or torsional strain to the spindle. The arrangement of the gearing is such that only the gears required for any one speed are engaged and no idle revolving gears add to the frictional load. The initial drive shaft transmits power through gears to a driven shaft, having a cone of five gears mounted on it. From here, the power is transmitted to a second driven shaft, which has a cone of three sliding gears engaging with three of the cone gears on the first driven shaft. A positive stepped clutch is formed on one end of the three sliding gears and by sliding these three cone gears along their shaft, they connect with a spring ten-

sioned cone of two gears with a positive stepped clutch. In this position, the five sliding cone gears are connected and give power to the fourth cone gear on the second driven shaft and by sliding these five gears further along, the fifth cone gear on the second driving shaft is engaged. This gives five speed changes directly to the spindle and by engaging the back gears this number is doubled. Both shafts having the cones of gears are mounted in anti-friction ball bearings at both ends and in the center and two of these bearings on the second driven shaft are placed close to the facewheel pinion to carry the heavy load.

The headstock is of box section with the sides extending up to the center line of the spindle and is reinforced by internal bracing. The interior of the headstock forms an oil reservoir, which is relied upon to keep the gearing well oiled and reduce the wear. The top of the headstock is hinged, which provides a means of convenient access to all the mechanism located therein. The large-diameter spindle is of chrome-nickel steel, with the front

bearing hardened and runs in phosphor bronze journals. Sight feed oilers are employed to lubricate the bearings, and the end thrust is taken up by alternate hardened steel and bronze thrust washers against the rear housing. A phosphor bronze flanged sleeve is secured to the headstock and a friction driving pulley revolves upon it, thus, it is pointed out, relieving the driving shaft from all belt pull. The friction drive pulley is inclosed at the outer end and the hub has an oil well constructed so that the oil is driven by centrifugal force through felt and is filtered before it reaches the bearing.

In addition to the vertical lever on the headstock for engaging the friction clutch pulley, a lever attached to the lower left corner of the apron is provided, so that the operator can start and stop the lathe without leaving his working position. With the constant-speed single-pulley drive this lathe can be belted directly from the lineshaft, or if necessary, a single-speed plain tight and loose pulley countershaft or a double friction pulley countershaft can be used. If desired, motor drive can be furnished without increasing the amount of floor space required. The motor is attached to an oscillating plate on the inside of the cabinet leg, the plate being pivoted to permit the motor to move up and down and thus secure the proper tension on the belt at all times. If desired, a direct-connected



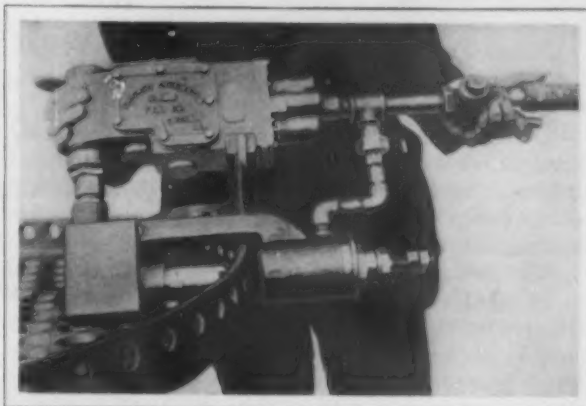
End View of the Lathe Showing the Arrangement of the Driving Motor

motor drive can be supplied by substituting a friction gear for the friction drive pulley and mounting the motor upon the rear of the cabinet leg.

The Fieser-Bentley-Warner Company, Wyandotte Building, Columbus, Ohio, has been dissolved by mutual consent. The company has been a prominent dealer in pig iron and coke. The members of the company were Louis F. Fieser, Linn Bentley and William Deshler Warner.

Pneumatic Countersinking Machine

With a view to eliminating the rigging, back stop and feed screws formerly required for drilling and countersinking holes in flanges, such as flue



A Pneumatically-Operated Machine for Drilling and Countersinking Flanges in Use for Countersinking Flanged Flue Sheets

and door sheets, channel irons, I beams, etc., the Chicago Pneumatic Tool Company, Chicago, Ill., has brought out a pneumatic countersinking machine. It is intended to be used in connection with the company's Little Giant drill, and one of the special advantages claimed for the arrangement is the speed at which the work may be done, it being possible to countersink flanged flue sheets at the rate of two bolts per minute, as compared with one bolt every two minutes, which was the former rate for doing this class of work.

The device is fitted with a No. 4 Morse taper spindle and a series of lugs which fit around the housing are relied upon to keep it from turning. Ball bearings are used throughout, and the bevel gears are inclosed in an oil tight chamber. The feed is automatic, being regulated by an air chamber or push-up device, which is designed to force the drill against the work with a constant pressure. The complete weight of the machine is 35 lb. and it will drill holes $1\frac{1}{16}$ in. in diameter within $1\frac{1}{2}$ in. of the side of a flange.

Estimated Metal Production for 1913

Estimates and statistics recently published by the United States Geological Survey show that the production of copper in the United States during 1913 from domestic ores and from all Lake mines decreased decidedly as compared with 1912. The smelter production for 1913 is put at 1,223,700,000 lb., as against an actual output of 1,243,268,720 lb. in 1912. The production of refined copper is estimated to have been 1,618,000,000 lb. for 1913, while the official figures for 1912 were 1,568,104,478 lb.

Preliminary figures for the production of refined lead from domestic and foreign ores in the United States for 1913 also show a decline, being estimated at 466,843 net tons for 1913, while the production for 1912 was 480,894 tons. These figures do not include an estimated output of antimonial lead of 16,338 tons in 1913, as compared with 13,552 tons in 1912.

Contrasted with copper and lead, the estimated figures for spelter for 1913 indicate the establishment of a record, the large increase being from domestic sources. The output of primary spelter for 1913 from domestic ores was 336,667 net tons and from foreign ore 8908 tons, or a total of 345,575 tons, contrasted with a total production of 338,806 tons in 1912.

Gas Producer Developing 3000 Horse-Power

Details of Installation at Alton,
Ill., of What Is Believed to Be the
Largest Producer in the World

— BY R. M. CHATTERTON —

What is believed to be the largest gas producer in the world was recently installed at the works of the Illinois Glass Company, Alton, Ill., by the Smith Gas Power Company, Lexington, Ohio. It is a mechanically operated producer having 240 sq. ft. of grate area. It operates on southern Illinois coal and the gas is used to replace fuel oil in a bottle factory. At times the gas has been taken from this producer to operate the company's 800-hp. power plant. It operates on the suction principle and is equipped with the Smith type F tar extractor,

flat rocking grate with stoking grates rising at an angle of 45 deg. on each side. The grates in each side of each section are independent of those in every other section, and the stoking grates may be operated continuously or at intervals, as conditions require. They serve to feed the fuel from the magazine down into the active part of the fire. The flat rocking grates cut the ash from the center of the fire and are operated by an air cylinder at the will of the attendant. Each section has its own independent blast and fuel supply and thus acts in



Charging Floor of the Gas Producer, Showing Steam-Driven Gas Pump and the Tar Extractors

which was described in the November Journal of the American Society of Mechanical Engineers in a paper by H. F. Smith, the inventor, reprinted at length in *The Iron Age*, November 20, 1913.

The accompanying illustrations of the gas generator give a good idea of its size and construction. The generator is built up of a series of transverse sections. In this case five sections were used. The two end sections are semicircular for structural reasons. The three middle sections are identical in construction and a producer unit of any size and capacity may be built by adding the required number of middle sections.

A horizontal cross section through the fuel bed is rectangular in form. The fuel is supported on a

many respects as a single producer. The quantity of blast for each section may be regulated by the operator so as to insure most uniform and consistent operating conditions.

A central water-cooled gas outlet is suspended from the head of the machine in the manner characteristic of the Smith producer. Two bell-type charging hoppers are provided in each section, being located on opposite sides of the central gas outlet. The producer is charged with coal clear to the head and the space above the lower end of the gas outlet and below the head acts as a fuel magazine from which the coal gradually settles into the active fuel bed assisted by the action of the stoking grates.

This peculiar construction gives large grate area

in small space and makes it possible to build single units of any desired capacity. It also increases producer efficiency by reducing the wall area and radiation per unit of capacity. The constant agitation of the fuel bed insures uniform gas quality. The central gas outlet which is placed low down in the fuel bed compels the blast to pass through the fuel instead of passing up along the lining and escaping from the producer without coming in actual contact with the coal. It also compels the volatile parts of the fuel, which gradually distil off in the magazine, to pass through a part of the hot and active fire where they are converted into fixed gas. For this reason the tar carried over in the gas contains less than 5 per cent. of the volatile of the coal and it will be shown later how this can be returned to the fire and gasified, thus converting the entire combustible of the coal into fuel gas leaving ash as the only by-product.

Other features of the plant are characteristic of smaller types of Smith producers for bituminous fuel, but are sufficiently novel to be worthy of careful consideration. In the first place, it may be noted that steam is not used in the blast. There are several good reasons for this, the chief of which is that it is not possible to control the ratio of steam to air in a manner sufficiently accurate to insure uniform operating conditions. In this plant the moisture for the blast is carried along with the air in the form of vapor, the air being heated and saturated

by contact with hot water. The saturation of the blast takes place in a steel tower filled with wooden grids over which hot water flows. By controlling the temperature at which the air leaves the saturator the ratio of vapor to air is definitely known at all times. In other words, the saturator is an air conditioning apparatus where the air becomes slightly super-heated and saturated for its temperature. The degree of saturation is taken care of automatically by a thermostat which controls the quantity of hot water admitted to the saturator. The water required is heated by the waste heat from the plant.

Another unusual feature of the plant is the gas cleaning equipment. This consists, first, of a primary condenser, or cooler, in which the gas is partly cooled by water sprays. Beyond the primary condenser is a steam-engine-driven Connorsville

horizontal Boston-type gas pump. The gas pump draws the gas from the condenser and, therefore, all of the apparatus up to that point, including the saturator, producer and condenser, operate under slight vacuum. This has proved to be the most satisfactory method of operating gas producers. It makes continuous operation possible. The ash-pits may be opened at any time and the fire cleaned, the grates inspected and ash removed without affecting operating conditions. Since the producer is under vacuum, noxious gases cannot escape into the room when charging or barring the fire and hence the labor troubles incident to the operation of pressure producers are not experienced.

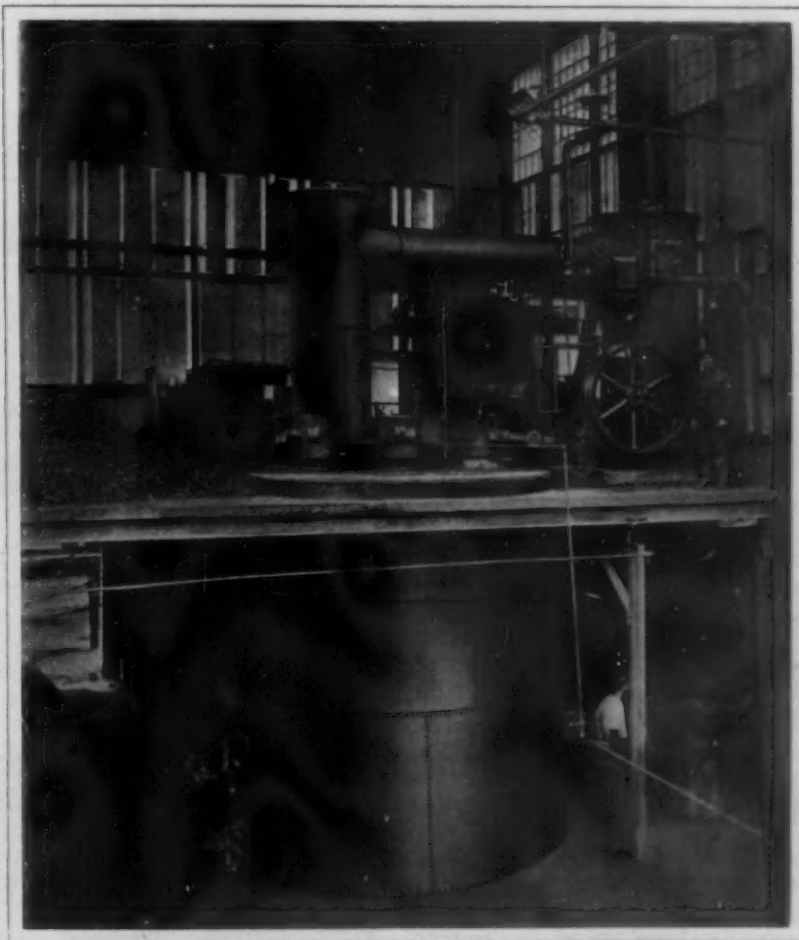
The gas is delivered by the pump under the necessary pressure to the type F tar extractor and gas main. The extractor is perhaps the most unusual feature of the whole plant and marks a great

advance in gas engineering. It has no moving parts, uses no water, requires a small amount of power and gives more effective cleaning than any other type of apparatus used heretofore for the cleaning of producer gas. The cleaning effect is secured by forcing the raw gas under high velocity through a porous diaphragm of glass wool. This diaphragm does not act as a filter because both tar and gas pass through it. The tar enters with the gas in the form of tar fog, and during its passage is agglomerated into large drops which fall out of the gas current by gravity

and drain into a trap, or sump, located in the gas main.

In this plant four extractors are installed in parallel, three of which are of sufficient capacity to clean the maximum output of the producer. The fourth is always in reserve. The extractors are shown in the photograph of the charging platform of the plant. They are the T-shaped housings mounted on the gas main. The one turned at right angles to the gas main is cut out of service. The extractors are designed so as to be cut in or out of service for inspection or repairs without affecting the operation of the plant.

Unlike most fuel plants where clean gas is required, no gas holder is to be found here. The gas is delivered to the distributing system under 1 lb. pressure. The pressure is controlled by the speed of the steam-engine-driven gas pump. A diaphragm



The Alton Producer Having a Mechanically Operated Grate of 240 Sq. Ft.

regulator operating on the engine governor controls the pressure automatically. In this way gas is made only in such quantities as the demands of the moment require. The exhaust steam from the engine is used to heat the water for the saturator. In this way the steam ordinarily required for blowing a pressure producer, in this case, not only furnishes vapor for the blast but also power for cleaning the gas and placing it under pressure.

The tar which collects in the trap beyond the tar extractor amounts to 6 or 8 gal. per ton of coal burned. It is very free from moisture and contains from 15,000 to 16,000 B.t.u. per pound. It may be used in the same manner as fuel oil for heating purposes. In some Smith plants arrangements are made for returning the tar to the producer automatically as it is made and converting it into fixed gas. The tar is returned in such a manner as to utilize the sensible heat of the gas leaving the fire in the destruction process. In this way producer efficiency is greatly increased because all of the volatile is converted into fixed gas and the amount of heat lost in the cooling water is greatly reduced.

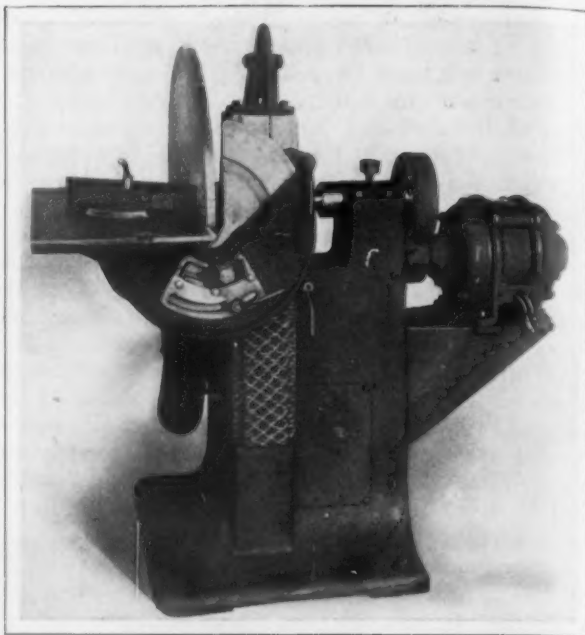
The plant was installed to replace 3-cent fuel oil. It operates on Southern Illinois coal costing \$2.25 per ton. No ash or coal handling apparatus is provided, so that coal and ash must be handled manually. Under these conditions the saving over 3-cent oil is approximately 25 per cent. on the investment. Included in the cost of operation were fuel, labor and all fixed charges.

The producer capacity, which is limited in this case by the capacity of the exhaustor, is about 36 tons of coal per 24 hr. The plant is in continuous 24-hr. service. The gas is very uniform in quality and averages about 155 B.t.u. per cubic foot. A continuous record of the gas quality is kept by a Smith recording gas calorimeter. With gas of this quality it is possible to reach any temperatures secured with fuel oil when used in furnaces of proper design. Since the gas is clear, cold and under high pressure, it may be distributed over a large area through relatively small pipes in the same manner as illuminating or natural gas. The gas is, therefore, well adapted to use in small furnaces for annealing, forging, heat treating, melting and all similar operations.

Two New Disk Grinding Machines

A direct-connected motor-driven patternmaker's disk grinding machine and a combination machine, which can be used by patternmakers and also for the grinding of metal has been placed on the market by the Gardner Machine Company, Beloit, Wis. The first machine is designed for use in ordinary patternmaking shops, while the other is used chiefly in experimental laboratories and in shops where special machines are built.

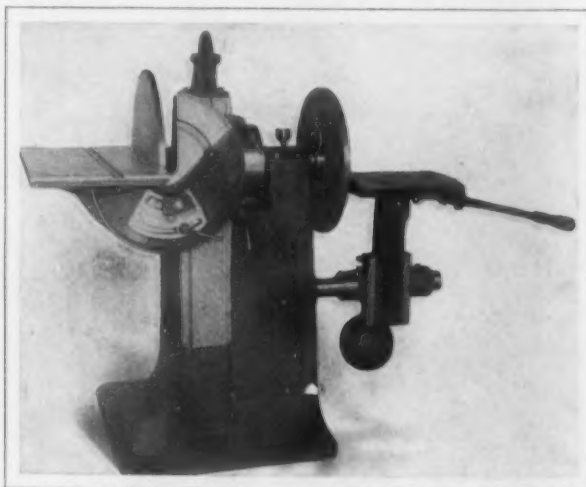
The patternmaker's machine is driven by a 5-hp. alternating-current motor mounted on a bracket at the right end. The power is transmitted to the spindle by spur gears and a rawhide pinion. The gears are covered by a semi-inclosed guard, but if desired, a fully inclosed guard can be supplied, in which case the gears run in an oil bath. At the opposite end of the spindle a steel disk wheel 30 in. in diameter, to which a garnet paper disk is attached, is mounted. A universal work table having both angular and vertical adjustments forms a part of the machine's equipment and is designed so that the inner edge always remains close to the grinding wheel, regardless of its angular position. The table is mounted on a dovetail way back of the grinding plane, and the weight is counterbalanced



A Direct-Connected Motor Driven Disk Grinding Machine

by a weight within the base of the machine. The equipment of the machine includes a universal angle gauge, which is shown in place on the table, together with several other of the builder's standard attachments. A number of different sizes of machine are built and they can be arranged for either an overhead or underneath belt drive and also with ball bearings.

The left end of the combination machine illustrated is the same as the patternmaker's machine described in the preceding paragraph, but the right end is equipped with a disk wheel 20 in. in diameter and a universal feed table. While the left end is used for such grinding as occurs in the mak-



A Combination Machine for Use by Patternmakers and Also for Grinding Metal

ing of patterns, metal grinding is done at the right end. In this machine provision is made for taking care of all the spindle end thrust from both directions.

The Chamber of Commerce of Vandergrift, Pa., at a meeting last week adopted resolutions asking that the Government discontinue its suit for dissolution of the United States Steel Corporation. At that place is located the Vandergrift works of the American Sheet & Tin Plate Company, the largest sheet plant in the world, having 37 hot sheet mills. The resolution was also signed by nearly all the business concerns in Vandergrift.

WATER-TUBE BOILER SPACE*

The Comparative Cost of Different Types on the Ground Area Basis

BY C. R. D. MEIER.†

The practice of driving boilers at loads considerably higher than the older rating of 10 sq. ft. per boiler horsepower results in a saving not only in the first cost of boilers and boiler accessories, but also in the cost of real estate, foundations and the power plant building. The latter savings are often greater than that of the cost of the boilers proper, especially where real estate is expensive.

The space occupied by boilers per rated horsepower, irrespective of the rate of driving, also influences the first costs. The additional space occupied by some types of boilers as compared with others will amount to from \$1 to \$10 per hp. in added first costs.

To compare the space occupied per rated horsepower by the various types of boilers a typical installation of eight boilers of 9000 sq. ft. boiler surface is presented in the accompanying drawing, and elevations of the different types of boilers are also presented. All of the types of boilers shown are typical of the most modern boiler plant requirements. With the type A boiler, which is shown at the top of the drawing, at the right, alleys will be required between each battery of two, as shown in the second of the diagrams at the left, for most stoker installations, but it is to be emphasized that for hand firing and some stokers, the entire eight boilers can be set solid, thus further decreasing the size of the boiler room, as is shown in the top diagram. It is possible to set boilers of this type solid, because there are no side cleaning doors, the soot being blown by a system of steam nozzles inserted through the hollow staybolts in the front and rear headers. With this exception all of the various types of boilers are set with 6-ft. alleys between each battery of two boilers and the comparative space required may be readily gauged from the illustration.

The total floor space occupied by the eight boilers of the different types, the floor space per rated horsepower for boilers only, and the square feet of additional boiler room floor space per horsepower have all been calculated. From this data it was ascertained that the type B, which is the third of the boilers shown at the right of the drawing, requires 72.2 per cent. more floor space than the type A, without alleys and 60.6 per cent. more floor space than the type A, with alleys. This type of boiler requires the greatest additional floor space. The type of boiler shown in the second diagram at the right requires the least additional floor space, the percentages being 36.2 and 19.2 per cent. respectively, as compared to the type A, without and with the alleys. While this boiler requires less additional floor space, it requires the greatest additional headroom, the space occupied being 52.3 per cent. more than that for the type A, the figures for height being based on measurements from the floor to the top of the highest part of the boiler drums. In this connection it is assumed that all the boilers had the same setting, 8 ft.

The savings due to decrease in floor space and headroom of the type A boiler, with and without alleys, as compared with the others, have been estimated, a value of \$10 per sq. ft. having been

placed upon the floor space. From this comparison, it was found that the additional cost with various types of boilers as compared with the type A, without alleys, ranges from \$3.49 to \$5.90 per hp., the figures for the type A boiler, with alleys, varying from \$2.37 to \$4.78 per boiler hp. If, however, instead of taking the average value of \$10 per sq. ft., the maximum and minimum values of 1 sq. ft. of floor space in a number of plants which

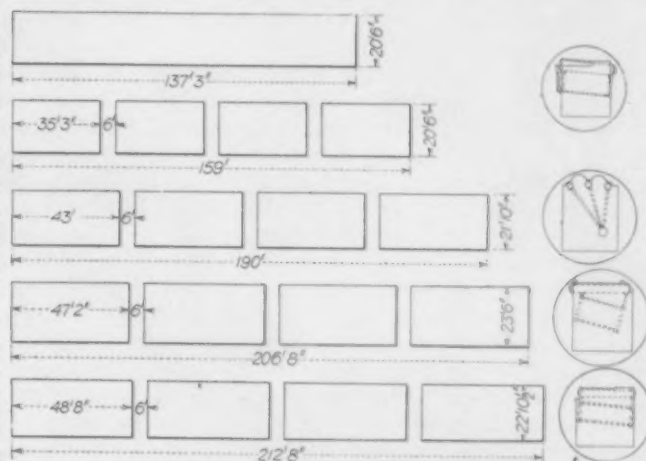


Diagram Showing the Relative Amounts of Floor Space Required for Eight Boilers of 9000 Sq. Ft. Heating Surface Each. The First Type Is Arranged Without Alleys and in Batteries of Two with 6-Ft. Alleys. The Other Three Types Are Arranged with 6-Ft. Alleys Between the Batteries of Two Boilers

are \$22 and \$3.50 respectively are taken, it will be seen that the saving in the space occupied with the type A boiler, as compared with various other types is from \$1 to \$10 per boiler hp.

Peat Production in Canada

Experimental work conducted by the Canadian government in the manufacture of peat has proved so successful that, according to Consul Felix S. S. Johnson, Kingston, Ontario, in the Daily Consular and Trade Reports, there are now two private concerns producing peat, one at Alfred, Ontario, and the other at Farnham, Quebec. The product is said to be satisfactory for use in grates and for cooking purposes. In connection with the new industry the Canadian government will experiment with the production of gas and electrical energy from peat. At the fuel testing plant in Toronto a 60 hp. gas producer engine is operated on gas from peat. If these experiments are successful sections of the central peat-producing districts of Canada where water power is not available will be able to obtain power from a series of these gas-producer engines.

The Eller Mfg. Company, Canton, Ohio, maker of sheet metal building products, has moved into its new plant, which has been under construction for a year. The company has a seven-acre site, of which the plant covers about two acres. Considerable new machinery has been installed, all of which is motor driven. J. F. O'Dea is president and treasurer, I. M. O'Dea vice-president and H. V. Pay secretary.

Frederick J. Knoedler has opened a place of business at 60 North Second street, Philadelphia, Pa., as manufacturers' representative and dealer in tin plate, sheets, metals, tinnerns' tools and machinery and tinnerns' supplies. For the past 20 years he has been connected with Calvert & Holloway, 68 North Second street, who recently discontinued business, owing to the death of P. B. Calvert.

*From a paper read before the Associated Engineering Societies of St. Louis.

†General sales manager, Heine Safety Boiler Company.

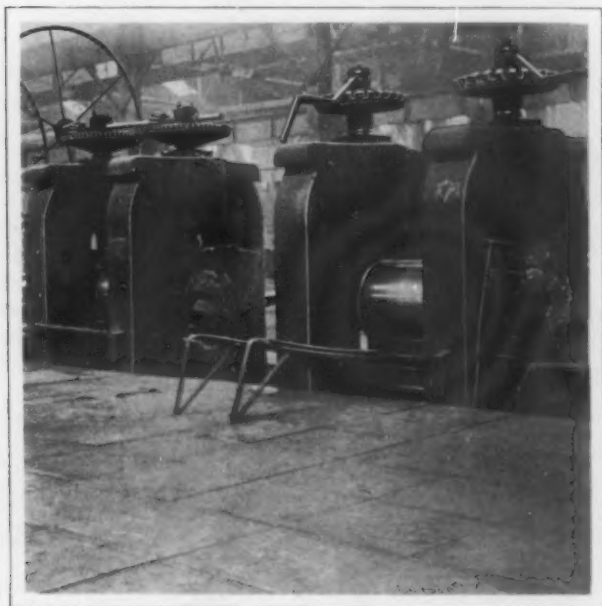
Water-Cooled Sheet Mill Standing

The National Roll & Foundry Company, Pittsburgh, Pa., has recently developed a water-cooled standing for sheet and tin mills. One of the special features is the attention that has been given to the practicability of construction. The standing to all appearances is the same as that ordinarily employed in sheet mills, but in addition it is possible to control the temperature without requiring any change in the layout for conditions that are common to all sheet and tin mills.

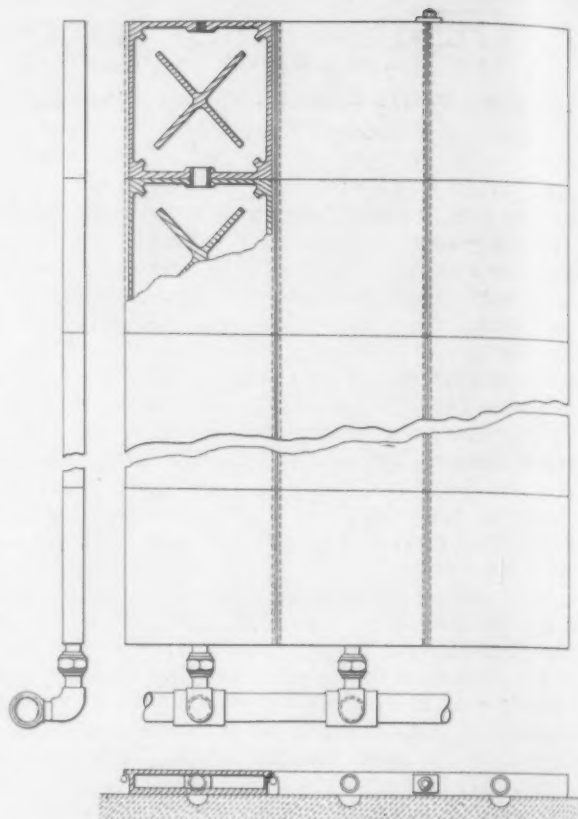
Each square of the standing, which is shown installed at the Follansbee Brothers plant, consists of a hollow cast-iron box, 2 ft. square, with walls $3\frac{1}{2}$ in. thick. As will be observed from the accompanying drawing, the interior of each square is supplied with a series of ribs which divide the water space into compartments. All of these are connected to compel a complete circulation of the water through each compartment, and the connection between the blocks is a push nipple, so that it is possible to remove or add any number of blocks without interfering with the remainder, while at the same time it is pointed out a continuous flow of water to all the compartments in the standing is secured. The diameter of the outlet is smaller than that of the inlet and the connection nipples, an arrangement made to keep full pressure of the water within every block in the standing.

The water after it has cooled the standing may be used to supply the boshes of the furnaces or the water shields, where these devices are employed. The temperature of the water as it emerges from the standing is of course higher than that at which it enters. This point is under the control of the men operating the mill and enables any desired temperature of the standing to be secured. In addition the standing of each set of rolls is independent of the other, so that it is possible to secure a wide variation in the temperature desired by the different crews, as the inlet valve is opened more or less to suit the wishes of the crew.

The cast-iron blocks are laid on a concrete base. It is stated that after a trial of six months no leakage of water from the connections between the different blocks has occurred, but provision is made in the concrete base to drain off the leakage into the mill pit. The blocks are held together by transverse bolts extending across under the standing,



View Showing an Installation of the Baird Water Cooled Standing for Sheet and Plate Mills



Section Showing the Manner of Supplying Water

and it is pointed out that no separation or sagging apart of the blocks is possible. If any block should be broken or destroyed, it is possible to cut the water supply off from the corresponding section without interfering with any other section.

Alloy Steels in Locomotive Construction

The growth in the use of alloy steels in locomotive design is thus referred to in an extensive article in the Railway Age Gazette for December 26:

"Alloy steels are being more widely used for many of the locomotive parts. In most cases the heat-treated steel is employed and very excellent results are reported. In a few cases a considerable reduction of section and of weight has followed the use of this improved material. More generally, however, the greater strength has been used for the purpose of reducing the unit fiber stress and thus increasing the reliability of the parts. The Pennsylvania Railroad allows 25 per cent. higher stress in piston rods and pistons when heat-treated steel is used. This followed tests which showed the elastic limit of the material employed to be 50 per cent. greater than the non-treated steel. The alloy most generally employed has been chrome vanadium. The number of parts of this material applied during the year to locomotives is given in the following table:

	Number of engines	Number of parts
Axles	466	1,277
Crank pins	188	580
Piston rods	69	138
Main rods	347	734
Side rods	354	1,840
Springs (engine and tender)	306	
Frames	776	1,592
Engine truck axles	62	62
Wheels		700
Tires		1,000

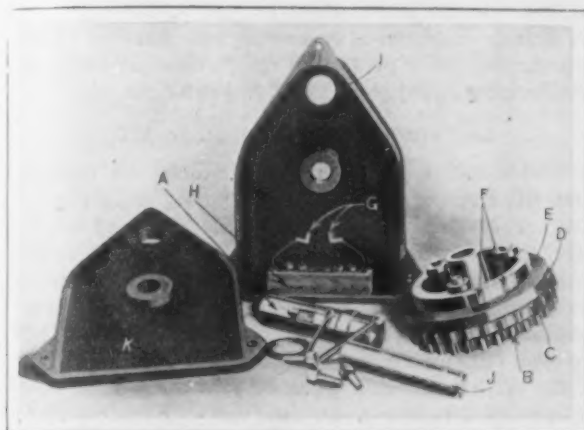
"The frames are simply annealed, but all other parts are heat-treated."

In the majority of cases the annealing is accomplished by slowly bringing the frames to the proper temperature and allowing them to cool in the closed annealer.

A New Electric Crane Limit Switch

As an addition to the modern safety appliances now made the Cleveland Crane & Engineering Company, Wickliffe, Ohio, has placed on the market a new limit switch for electric traveling cranes. This switch is of the closed-circuit type, being connected in the hoisting motor circuit and controlled by the hoisting mechanism. There are various types of limit switches on the market, some operating with the block, some with a screw and some with a weight.

A limit switch to perform its essential function of protection in the face of careless operation should be so constructed and connected in the hoisting motor circuit that it will also be in operating



A Recently Developed Safety Device for Use in Connection with Electric Traveling Cranes to Prevent Overwinding of the Hoist

condition when required. While any mechanical device will sooner or later get out of order it is claimed for the Cleveland Crane closed-circuit type of limit switch that there is the minimum amount of danger of its getting out of order and that its construction is such that warning will always be given should there be anything the matter with its working parts. The switch is so connected in the hoisting motor circuit that the electrical operating parts are always charged with current when the hoist is in operation, and should any defect such as a broken wire or a loose connection develop it at once throws the motor out of commission in the same way as though the hoist had been run to the limiting point. This condition gives positive assurance that the limit switch mechanism is unfailingly in working condition when the hoist is running. Among other advantages claimed for this switch are the simplicity and accessibility of parts and the facility with which they may be installed.

The accompanying illustration shows the various parts of the limit switch and aids in making the method of operation clear. The tripper A is connected to the end of the hoisting drum shaft by two pins driven into the end of the drum shaft. Four holes, drilled in the end of the tripper, allow for one-quarter turn positive adjustment. A tooth at the end of the tripper engages one tooth of the tripper sprocket B at each revolution of the drum. An oval recess, cut at the side of the tooth in the tripper permits the check sprocket C to rotate while the tripper tooth is engaged in the tripper sprocket. The conformation of the teeth on the outside of the check sprocket to the radius of the tripper is relied upon to prevent the sprocket wheel from turning while the tripper is completing the revolution. Attached to the sprockets by small insulated through bolts is a fiber insulating ring, D, and a

brass contact ring, E. In the brass contact ring, two fiber contact blocks, F, are inserted, the distance between them depending upon the number of revolutions the drum makes in allowing the hoisting block to travel between the two extremes of position. Mounted on a fiber block, H, are two contact springs, G, which make contact on the brass contact ring E.

The circuit leads are attached to the terminal posts of the contact spring, and are connected to the coil of a magnetic switch, which carries the hoisting motor current, located in the cage within easy reach of the operator. When the block reaches the limit of its travel the switch is opened by the breaking of the circuit in the switch coil caused by the contacts G resting on the fiber blocks F. A cast-iron box, I, incloses the entire mechanism and is attached to the frame of the trolley by through bolts. One end of the pin J, which carries the contact ring and sprockets, is held by a bearing in the box and the other by a bearing in the cover K. The tripper pin is held in place in the same manner. When the cover is removed from the box, every part is instantly accessible and may be readily removed. The small size of the switch makes it very easy to install.

It is stated that the principal objection to the block-controlled switch is the large number of parts, these having three times as many parts as are used in the Cleveland Crane type to accomplish the same results, and that consequently there are more chances that the former will get out of order. In the block-controlled type of switch four or more contact fingers are arranged over a drum, two or more of which are normally in circuit, being in series with the hoisting motor. When the block in hoisting nears the upper limit it engages a rope or lifts a weight, which carries the switch mechanism to the trip position, cutting off the motor current and closing a local dynamic circuit through the remaining contact fingers. The switch is set for the maximum travel so as to take advantage of the dynamic action, but it is pointed out that if one of the contact fingers becomes loose, a screw or some other part is displaced, the tripping mechanism becomes fouled, or any one of several other possible contingencies arise, serious trouble may result.

The Electric Steel Company, Indianapolis, Ind., has been formally organized. Hugh McK. Landon, late vice-president of the Indianapolis Water Company, has been elected president. J. D. Forrest, secretary and manager of the Citizens' Gas Company, is a member of the board of directors. James M. Ryan, formerly in charge of the Canadian Pacific Foundries, Ltd., Montreal, and previous to that with the Mesta Machine Company, will be general manager. The company will build a plant near the Indianapolis Speedway and will make electric steel castings, which are expected to take the place of heavier iron castings for high-grade machinery. The electric furnaces to be used in the new plant are patented by H. H. Ruckman, Jr., chief engineer of the company.

The Crawford & McCrimmon Foundry, Brazil, Ind., has obtained the contract for furnishing all the castings for the Vandalia Railroad shops at Terre Haute this year. The company has just moved into its new building.

It is announced that Birmingham and Gadsden capitalists will build a \$75,000 soil pipe plant either in Gadsden, Ala., or the immediate Birmingham district.

A Year of Steady Declines in Great Britain

The Course of the British Iron and Steel Markets in 1913—Price Readjustments and Continental Inroads

(Special Correspondence)

LONDON, ENGLAND, December 19, 1913.

The year now passing out has been one of almost unrelieved disappointments. In this respect it does not differ wholly from some of its predecessors; but the early promises were not fulfilled to anything like the extent which reasonable hopefulness might have anticipated, and during the latter part of the year all the conditions made for unrest and distrust.

A TROUBLED PIG-IRON MARKET

As regards pig iron, the year opened with prices on a high plane, though not higher apparently than was justified by the condition of trade, for the price of near delivery iron stood at a discount compared with three months delivery. But in the early days of March this apparently sound position gave place to something very different. The latter delivery then stood at a discount, and the margin between the two widened steadily until on May 23 it amounted to 10s. a ton, Cleveland cash iron being quoted at 70s. and three months iron at 60s. This was the dying struggle of the bulls, and a speedy collapse followed, from the effects of which the market as a whole has not yet fully recovered. Within a month from the corner date, the price for cash iron dropped 17s. and the leading firm which had engineered the entire deal had collapsed.

The manipulation gave the first kick to trade buying, scaring consumers out of the market, which they have not re-entered with any freedom since. It was the ridiculous inflation of the price which first engendered mistrust and resulted in a resolve on the part of users not to buy until the last moment. This policy in the end paid those adopting it so well that there has since been no inducement to revert to the plan of contracting ahead. With it all, the stocks of pig iron in the Cleveland warrant stores have been steadily falling, and today stand at quite an insignificant total. But the times are decidedly inauspicious for the engineering of corners in commodities, and those who ran the last venture furnish an object lesson for a time as to the folly of attempting such control. Besides this, if the stocks of pig iron on warrants are small, it is not because consumption is so good, but because it is so poor that furnace owners prefer to shut down their plants to running them at a loss, and, by accumulating stock, rendering the position all the worse. All the talk is of the shutting down of stacks and the process has become very general, not in Cleveland alone, showing the widespread nature of the reaction which is in progress. Trade is very dull now, and it is bound to take some time for things to get out of the rut into which they have slipped.

NO HOPE OF AMERICAN BUSINESS.

The fiscal changes in the United States were pretty confidently expected to make a lot of difference to the European exporting countries, but so far it has been a case of "much cry and little wool." And really there seems little reason why United States producers should not in times like these hold their own to the exclusion of the foreigner. Amer-

ica wants work and that is the dominant factor when orders come along. True, a moderate quantity of Cleveland iron was bought some time ago for the account of an American firm of founders, and the market has been agitated at times by reports that there were inquiries in the freight market for tonnage to ship it to Philadelphia; but so far the owners are content to sit on the warrants. Ultimately the iron may be shipped, but the operation cannot be a profitable one unless present circumstances undergo a very radical change.

LOW-PRICED CONTINENTAL SALES.

The Continental position has been an incubus upon the British market. In Germany things in the summer turned very blue and the greatest efforts were made to market material abroad. Then the weakness spread to France and Belgium, and what with these countries competing in England, Scotland and Wales for business, a very unsettled feeling was engendered and buying was restricted further. Within the last week or two there have been reports of a rather more favorable character from Germany, but the improvement does not amount to much when translated into terms of marks per ton. There has, however, been an attempt to put pig iron better, which is said by gossip to emanate from a powerful group of German pig iron producers. These, it is said, have been buying warrants heavily in Glasgow, the idea being that if only the price of Cleveland iron can be driven up, the German producers will be able to maintain their prices. If Cleveland iron falls much below the German product, consumers will naturally buy the cheaper iron, hence the desire to manipulate Cleveland warrants for the sake of upholding domestic prices in Germany. The theory is all right; but it might just as well be that consumers were buying so as to be independent of the Germany pig iron syndicate. However, the report is given for what it may be worth, as showing the trend of thought on this side.

READJUSTMENTS OF HIGH COSTS.

Of course, the market has for months been surfeited with statements that iron cannot be made at anything approaching today's prices, and there is no doubt that it cannot if it is to be made from materials bought a twelvemonth or so ago when the market was near the top. The matter is one of simple adjustment, and will on this as on other occasions right itself sooner or later. Even as it is, the biggest people can make ends meet, for they own everything from the ore up, and this gives them an advantage over their competitors who have to buy everything on contract. These high-priced contracts are now running out and when the more recent ones come on, a different tale will be told. Already some considerable relief is coming from lower wages, and a further reduction of costs in this direction is certain when the next wage returns are made up. This is one of the very good points in the wage scheme of the iron trade, that wages fluctuate automatically according to the selling prices of the material. Hence when prices are high so, automatically, are wages, and when prices fall then

wages come down. The regulation of wages in this way is an inestimable boon to the trade, avoiding as it does all the labor disputes which have proved so hard to handle in other industries. As soon as things begin to pick up a bit, there is bound to be talk of another boom, but the cautious man will keep one eye at least upon the idle plants. When there is trade sufficient to get these back at work, it will be time to review the outlook in a more hopeful spirit than is possible today.

THE COURSE OF SEMI-FINISHED STEEL

Very considerable interest has attached to the position of semi-finished steel, for this has afforded a closer index to the state of general trade on the Continent than is possible usually. The year was advanced only a few weeks when signs of an easier feeling creeping on became perceptible. For example, the year opened with Continental sheet bars at 112s. 6d. a ton free on board, but 2s. 6d. was knocked off this by the end of January, and by the end of March the price was 107s. 6d. It steadily declined until at the end of June 83s. was the figure, while early in November 80s. was the ruling price. As a matter of fact less than this figure was accepted in some cases for good lines; but the prices named approximately represent the position of the larger makers. A feature of the year has been the continued offering of French material, as a rule in small lots at very low figures. Some of these French sheet bars are beautiful steel and a few lots have been bought by Welsh mills rolling the thinnest gauges of tin plates. The great bulk of the bars imported goes to the galvanized sheet works, some of which bought heavy lines in the neighborhood of 80s. f.o.b. The German position is now reported to be a little better, and certainly prices of finished and half-finished material are rather above the worst points touched. But the improvement does not amount to very much after

all, and it is not easy to see how there can be any real improvement until fuller time is being worked at the mills than is the case just now.

THE REBATES ON PLATES AND SHAPES.

In finished steel and iron the direction of prices has been pretty consistently downward and severe losses are registered. The folly of the steelmakers in fixing up a rebate scheme whereby it was thought to keep consumers, under heavy penalties, from buying foreign material has been very clearly demonstrated and the effects of the policy have been to antagonize the shipbuilding industry and other sections of consumption and to bring about the disorganization of the steelmaking end of the business. Owing to the refusal of the Scotch section of the association to moderate its prices for ship plates, etc., when prices everywhere were falling, the shipbuilders turned to Germany, and bought there tens of thousands of tons of steel at prices enormously below those quoted by local makers. It was the pressure of these imports of German steel into the very heart of what were regarded as the preserves of the Scotch steelmakers that forced an issue, and the last state of the association was worse than the first. Nobody quite knows what will be the next move, for although the Scotchmen have abandoned the rebates, they are retained by the English section of steelmakers. Meantime the outlook is obscure. In the lighter sorts of steel very low prices have been taken by the Germans and Belgians and considerable sales have been made to the Midlands and Scotland with, of course, a restricting influence upon the operations of British producers, and any amount of material can even yet be had.

PRICE FLUCTUATIONS.

The accompanying table shows roughly the course of prices during the year on leading iron and steel products.

	Early Jan.	Early April	Early July	Early Oct.	Today
Cleveland pig iron.....	68s	66s 9d	55s	55s	55s 6d
Cleveland hematite	83s	81s 6d	75s 6d	66s	60s 6d
Glenarnock Fdy. No. 3.....	78s 6d	77s 6d	73s	71s	68s
Midland marked bars.....	£10	£10	£10	£10	£9
Midland common bars.....	£8 12s 6d	£8 7s 6d	£8	£7 7s 6d	£6 17s 6d
Midland sheet bars.....	£6 5s	£5 15s	£5 7s 6d	£5	£4 15s
Midland joists	£7 10s	£7 10s	£7 10s	£6 15s	£6 15s
Scotch malleable bars, home trade.....	£8 10s 6d	£8 7s 6d	£8	£7 7s 6d	£6 12s 6d
Scotch Siemens bars.....	£9	£9	£7 10s	£7	£7
Scotch ship plates.....	£8 7s 6d	£8 7s 6d	£8 7s 6d	£7 7s 6d	£6 7s 6d
Foreign steel bars, f.o.b.....	112s 6d	112s 6d	86s	87s 6d	82s
Foreign joists, British trade, f.o.b.....	112s-115s	112s-117s	112s-115s	108s-111s	105s-108s
Foreign plates, f.o.b.....	136s	128s	112s	104s	101s

Heavy Melting Steel Scrap Prices at Pittsburgh

The appended table gives the average monthly prices of heavy melting steel scrap at Pittsburgh for 14 years, comprising 1900 to 1913, inclusive. These prices are per gross ton and are averaged from weekly quotations in the Pittsburgh iron market report of *The Iron Age*.

	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913
January	\$20.00	\$13.00	\$17.40	\$21.20	\$12.50	\$16.25	\$17.25	\$18.95	\$12.80	\$16.63	\$17.69	\$13.50	\$12.75	\$14.95
February	21.00	14.50	17.63	21.13	13.50	15.88	16.31	18.06	13.88	15.63	17.25	14.13	12.12	14.19
March	21.50	16.00	18.50	21.00	14.00	15.90	14.70	19.00	13.19	14.19	16.80	14.35	12.62	14.19
April	21.00	16.50	19.00	21.50	13.63	16.00	14.75	17.94	12.80	14.00	16.50	13.06	13.06	14.19
May	17.00	17.00	20.00	21.25	12.13	15.00	14.80	18.10	12.81	14.81	15.30	12.62	13.26	19.55
June	15.00	17.50	21.25	20.00	11.30	13.90	15.63	18.38	13.13	15.69	16.10	12.95	13.44	12.62
July	13.00	17.00	21.90	19.70	10.75	14.00	15.75	18.06	14.25	15.90	14.50	13.08	13.34	12.40
August	12.00	16.00	21.00	18.50	11.38	14.85	16.50	17.75	14.81	16.31	14.31	13.20	13.55	12.37
September	11.00	15.00	21.50	17.25	11.50	15.38	16.88	17.38	14.25	17.40	14.35	12.50	14.11	12.25
October	12.00	17.50	21.50	15.30	12.25	16.50	17.13	17.10	15.20	17.94	14.25	12.06	15.85	11.85
November	12.00	18.00	21.00	13.25	14.25	17.50	18.00	14.88	16.06	17.50	14.25	12.00	15.12	11.44
December	12.50	17.50	21.00	11.20	16.20	17.63	20.00	13.00	16.70	18.00	13.75	12.31	14.75	11.08

The Use of Stellite in the Machine Shop

What the Material Is and Results Which Have Been Obtained With It in Machining—The Question of Cost

—BY ELWOOD HAYNES—

Whenever any new material is proposed as a partial substitute for one already in use, various misunderstandings are likely to arise. Exaggerated accounts of its capabilities are likely to be given, and because of this, some of its purchasers are likely to be disappointed when it does not fulfill the exaggerated accounts.

Most of the trouble, however, which arises from the introduction of a new material or new device is due to an improper understanding of its capabilities and improper application of it in practice, so that the new device or new material is likely to have a setback, which it really does not deserve. This was true of aluminum, of the new abrasives, of the automobile, and of countless devices which have since won their way by sheer merit into extensive practical use.

Stellite is an alloy formed from the semi-rare metals, all of which are very much more expensive than iron, but factory superintendents are now well aware that it does not always pay to buy low-priced steel for tools simply because it is cheap. It is not the low cost of the metal in the tool that determines whether it will pay or not to buy it, but the efficiency of the tool under intelligent care and handling. Take for example a tool made of carbon steel; the metal in this tool may cost 10 cents per pound, while the metal in the high-speed tool may cost 75 cents or \$1 per pound. Taking the carbon steel tool as a basis, limiting the time of operation on a given piece of work, the substitution of a high-speed tool in its place, costing ten times as much, may yield a sufficient profit to pay the increased cost of the high-speed tool within a single day or perhaps within a few hours. But in order that the high-speed tool may accomplish this result, it must be given a chance to prove its efficiency. If, for example, a machine is running so slowly that a piece of carbon steel will take the cut without losing its hardness, then there will be no advantage in using the high-speed tool, but the up-to-date manufacturer will see to it that his factory is equipped with machinery that will give the best machines a chance to do their best work.

There are four attributes which should characterize a machine tool: 1, sufficient hardness; 2, sufficient strength; 3, ability to resist high temperature due to cutting speed; 4, resistance to wear. The word hardness is not very well understood, since there seems to be several kinds of hardness. The chief of these are, however, abrasive hardness and elastic hardness. Thus it often happens that the scleroscope which shows the elastic hardness will indicate a greater number of degrees for a substance of comparatively low abrasive hardness than for one of high abrasive hardness. This is because a substance may be very hard and at the same time not very elastic, though usually hardness and elasticity accompany each other.

When measured by abrasive hardness, stellite tools are perhaps superior to all others, since the hardest of them will scratch almost any other metallic combination. On the other hand, they are usually not so elastic as steel tools, and high-speed steel tools are less elastic, generally speaking, than

carbon steel tools. Nevertheless, the high-speed steel tool is sufficiently elastic and sufficiently strong for all practical purposes, and is usually capable of working at far greater speed than the carbon steel tool. Likewise, the stellite tool is sufficiently strong and elastic to perform its work profitably and expeditiously, when properly installed and properly applied.

LARGE PROFIT WITH SMALL PRODUCTION INCREASE

It is obviously, however, only in those cases where the cutting operation is comparatively long and the time of change comparatively short that a high-speed tool can show its greatest advantage. Now the profit on a given piece of work, other things being equal, depends upon the difference between its cost and selling price. Even a small increase in production without increase of cost may result in a large increase in profits. Supposing, for example, that the net profit on a given article after all costs are paid is 10 per cent. Now, if by some means 10 per cent. more product can be made for the same cost, then the profits have increased 100 per cent. and it is just at this point that a tool of high efficiency may so greatly increase the profits of a concern that the cost of the tool becomes insignificant. Almost every other method of increasing profit, except by organization, calls for the investment of large sums of money, often with heavy interest charges and lack of dividends. The return from the small tools is immediate and tangible.

CASES OF LARGE OUTPUT WITH STELLITE TOOLS

Perhaps no better idea can be gained of the practical value of stellite in the machine shop than by a few actual illustrations. In a certain factory a steel tool had been used for cutting off gear blanks from a 3-in. round nickel steel bar. The operator, by using a soap solution on the tool, was able to cut off one blank in 8½ min. A stellite tool was substituted for the steel one, and he was able to cut off a blank in just a little over 4 min., and in the actual day's run, he cut just twice the number that could be cut off with the steel tool. The stellite tool cut off 600 blanks with regrinding, while the steel tool required grinding several times per day.

In the same factory an operator was able to turn 60 pistons per day with a steel tool, but by substituting a stellite tool for the steel one, he was able to turn from 90 to 100 per day. These pistons were afterward annealed and then a finishing cut was taken from each. This finishing cut was made in half the time with a stellite tool than was required by a steel one.

In facing engine cylinders a large milling machine was able to face off eight cylinders per hour with inserted steel tools. The steel tools were replaced with stellite, after which the machine faced regularly 16 cylinders per hour.

LIGHT CUTS AT HIGH SPEED ADVISABLE

Generally speaking, the best results are obtained by using stellite for comparatively light cuts, moderate feed, and high speed. For example, a stellite

tool was able to turn a piece of tool steel, containing 1.25 per cent. of carbon under the following conditions: Depth of cut 1-16 in., reduction of diameter $\frac{1}{8}$ in., feed 55, surface speed 180 ft. per minute. During this process the point of the tool became distinctly red after cutting the first 2 in., and remained so until the end of the cut, which was about 6 in. in length. The edge of the tool was not injured in the slightest degree by this overheating. There was absolutely no measurable loss in the diameter of the bar. The turned surface was very smooth and uniform. The tool used in this operation was extremely hard and rather brittle, in fact it was somewhat difficult to grind it to a smooth edge, so a whetstone was used for giving smoothness to the cutting edge. It seems remarkable that the tool would hold so perfectly while cutting the steel and it is probable that its edge was toughened somewhat by the increased temperature produced by the turning.

In regular practice tools are now made nearly as hard as the tool mentioned, which will take a fairly sharp cutting edge directly from the emery wheel. There was some difficulty in the beginning due to the likelihood of stellite tools to break in use. This has been largely overcome: 1, by increasing the strength of the metal; 2, by making sure that the hole in the tool holder is perfectly smooth and uniform, particularly on the bottom.

Some of the first samples of $\frac{3}{8}$ -in. square stellite tools would stand from 400 to 600 lb. transverse pressure at a point 1 in. from the holder. They are now required to stand at least 1000 lb. under the same test, and some of them have stood as high as 1800 lb. without breaking. In fact, the breaking of a stellite tool is now becoming very unusual, particularly if proper precautions are taken. From the tests recorded above it is evident that very great pressure can be sustained at the end of a $\frac{3}{8}$ -in. square tool, projecting as it usually does only about $\frac{1}{2}$ in. or even less from the holder.

It should be distinctly remembered that stellite is not a steel and it is no more logical to call it by this name than to call brass or copper or diamonds steel. Steel is a compound of iron with other materials, and iron is always the predominating and essential constituent of all steels. Stellite is composed of the metal, cobalt, alloyed with other substances, and contains no iron. The name, stellite, is derived from the Latin word, stella, a star or strewer of light, and has no reference whatever to the word, steel. It was given this name because when the alloy is polished, it retains its brilliant luster under all atmospheric conditions.

NOT TO BE CONFUSED WITH COBALT STEELS

It must not, therefore, be confused with the so-called cobalt steels, which are alloys of iron or steel with cobalt and other metals. My own experiments have convinced me that the introduction of iron into stellite is always detrimental. The stellite machine tools can neither be forged nor hardened. If they were affected by heat they would lose their hardness when raised to a high cutting temperature. If they could be forged, it would be necessary for them to soften at a high temperature, which would, of course, destroy their cutting edge. Hence they are cast as nearly as possible into the desired form, then finished by grinding.

Owing to the comparatively expensive materials used in making stellite, its cost is considerably higher than even the highest priced high-speed steel. In some cases, for example, in turning hard cast iron with a $\frac{3}{8}$ -in. square bit, it has been found in

actual practice that the stellite tool costs 3 cents per day, while the steel tool doing only half the work costs 6 cents per day, the wear on the steel tool being more than ten times as great as on the stellite tool.

But even if the cost of the stellite tool were four or five times as great per day as that of the steel one, there are numerous instances in which it would pay well to use the stellite; indeed, it is reported that a certain employee in the government service, after using a stellite tool for a few days on piece work, asked the management having charge of the work how much it cost per lb. On being told that its price was \$5 per lb., he replied, "I will give you \$10 per lb. for it, if you will not cut my piece rate below the present figure."

Book Review

Questions and Answers Relating to Modern Automobile Design, Construction and Repair. By Victor W. Page. Pages, 600. 6 x 9 in.; illustrations, 350. Published by Norman W. Henley Publishing Company, 132 Nassau street, New York City. Price, \$1.50.

The book consists of a series of 36 lessons, covering with nearly 2000 questions and answers the automobile, its construction, operation and repair. It is a practical, non-technical work and deals with new developments in the automobile field, such as the Knight motor, worm gear drive, electric self-starting and lighting, electric gear shifting, two speed rear axles, worm gear and four-wheel drive, wire and cast wheels and other points of recent development.

Commencing with the modern gasoline automobile and its principal parts, the lessons are arranged in logical order, the arrangement being roughly the motor, its action, its parts and their functions and the fuels used, followed by the theory and practice of carburetion and the explosion of the gas in the cylinder to produce power. Ignition, lubrication and cooling are next discussed, followed by a description of the various types of transmissions. The frame, the steering gear, the wheels and the bearings, are then touched upon, followed by instructions on the operation of a car and a description of the troubles frequently encountered, their symptoms and the remedies.

One of the features of the forthcoming convention of alumni of Stevens Institute of Technology, to be held in the auditorium of the college, at Castle Point, Hoboken, N. J., at 3 o'clock on Friday afternoon, January 9, will be a technical conference to discuss the engineer's part in the regulation of public utilities. The subject will be discussed by Dr. Alexander C. Humphreys, president Stevens Institute, who will act as chairman; John W. Lieb, Jr., vice-president New York Edison Company; James E. Sague, member of the Public Service Commission of New York; Newcomb Carlton, vice-president Western Union Telegraph Company; George Gibbs, consulting engineer, Pennsylvania Railroad, and George J. Roberts, vice-president Public Service Corporation of New Jersey. All these men are Stevens graduates.

The Gordon Iron Company, scrap iron and metal dealer, Chicago Heights, Ill., has installed a large shear made by Doelger & Kirsten, Milwaukee, Wis., and also erected a drop hammer 90 ft. high, and is now prepared to handle anything in the scrap-iron line.

ESTABLISHED 1855

THE IRON AGE

Published Every Thursday by the DAVID WILLIAMS CO., 239 West Thirty-ninth Street, New York

W. H. Taylor, *Pres. and Treas.*

Charles G. Phillips, *Vice-Pres.*

Fritz J. Frank, *Secretary*

M. C. Robbins, *Gen. Mgr.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: Equitable Building. Philadelphia: Real Estate Trust Building. Cleveland: New England Building. Cincinnati: Mercantile Library Building.

Subscription Price: United States and Mexico, \$5.00 per year; to Canada, \$7.50 per year; to other foreign countries, \$10.00 per year. Entered at the New York Post Office as Second-class Mail Matter.

EDITORS

GEO. W. COPE

A. I. FINDLEY

W. W. MACON

CHARLES S. BAUR, *Advertising Manager*

The Ford Profit Distribution

Comment upon the surprising announcement of a proposed distribution of profits among employees, made this week by the Ford Motor Company, of Detroit, may well wait upon further details of the plan. In outline the company's statement is that it will give its employees out of the profits of the coming year \$10,000,000, a portion going into each semi-monthly pay envelope; that to give employment to more men it will run 24 hours a day, substituting three eight-hour shifts for two of nine hours each; and that for men over 22 years of age \$5 will be the minimum wage for eight hours' work, employees worth more than that being paid according to their value. The proposal will be of particular interest to readers of *The Iron Age* in view of the article in our issue of January 1, 1914, describing the new system put in effect at the Ford works in October, designed to secure the highest skill and performance in the working force and continuity in its service to the company.

It is too much to hope that due weight will be given to President Ford's opinion that "this is not a plan for any company but ours." The success of the Ford enterprise puts its story beyond the pale of sober history and in a place of its own in the romance of industry. Scarcely less astonishing than the confidence with which \$20,000,000 profits for 1914 are already counted, with the business outlook far from brilliant, is the information thus given that \$100 net profit is realized on an automobile holding a place so uniquely low in the scale of prices. But these and all the other exceptional features of the Ford proposal, including its well-nigh prodigal generosity, are apt to make a smaller impression on many minds than the line of thought suggested by this single statement of the company's head:

We are in hopes that other employers will recognize the unequal distribution of earnings and endeavor in their own way to make a better division.

Ten thousand men struggling for jobs at the gates of the Ford works on the day after the plan was announced showed that one of the old economic laws was still at work—that labor, like capital, flows promptly in the direction of largest reward. But what is likely to be missed in the confused thinking that will now be widely heard from is that what labor and capital take out of an industry must be gauged by what they put into it. What

Mr. Ford says about the unequal distribution of earnings has been too true in many cases. There are notoriously underpaid employments. But today, in some industries, the pendulum is swinging the other way, and wrong interpretations of the Ford policy for 1914 will only intensify a condition under which proprietors and investors are faring hardly while labor enjoys the largest return it has ever had. We do not refer now to the handicaps under which many employers in the machinery trades have worked in recent years because of the exceptional wages paid by automobile companies. It is perhaps not inappropriate that an industry ministering largely to luxury and pleasure should become also labor's industry de luxe. The harm that will come from the popular interpretation of this week's announcement at Detroit is in the notion, to which the words above quoted will give some encouragement, that all employers can do better for their workmen. And more power will be given to the seeming belief that there is a strong box behind every establishment, from which wage advances can be taken when workmen conceive them to be necessary. The idea that the workman must himself create that which he asks to have awarded him is being lost in the maze of "social advance" which is now considered sufficient warrant for every demand made upon an employer.

Taking Advantage of a Slack Time

The slowing down of business has given managers of industrial works the opportunity to look into their properties with a view to putting them on a basis of high efficiency. This will result, in not a few cases, in a demand for new equipment to replace out-of-date machinery, or in securing a better balance between departments, or in a general increase in capacity. It is a factor which should figure in the next buying movement not very long after it makes a start, and many observers believe that time is not very far in the future.

The superintendent who is striving to the utmost to get out a maximum of product, under the constant hounding of the sales department, is compelled to neglect to some extent the scrutiny of details other than those which have to do with actual manufacturing. Under these conditions cost reductions are not followed up sharply. Sacrifices must be made, if necessary, for demand must be

met. The enforced neglect is liable to spread, showing itself in carelessness or procrastination in the keeping of records, in laxness in respect to the shop system and in various other ways. The reaction which comes with a sharp let-down in orders is more or less demoralizing in accentuating undesirable conditions in the plant routine.

When the manager and his assistants get down to the business of bringing the works back to normal, they usually find plenty to do. Recommendations of changes in the grouping of machinery, of new equipment and extensions, are studied with great care. Department heads are brought into the planning. In the beginning the improvements may be confined to rearrangement and other changes that require small outlay of money. Others follow, with improved financial conditions and a more hopeful outlook for business. Plans are made in detail, ready to be carried out at the right juncture. Evils that have crept into the cost or bonus or efficiency system are rooted out.

When business again revives and demand reaches a point calling for concentration upon output, the manager knows that his house is in order and that a basis of economic production has been re-established.

The Consumption of Rails

Through the annual compilation of the Railway Age Gazette statistics are now available of the mileage of new steam railroad track laid in 1913. For a number of years the Gazette has compiled statistics of the mileage of new road constructed, but the statistics are now made of special interest to the steel manufacturer by including the mileage of second, third and fourth track. The consumption of rails is substantially as large in a mile of subsidiary track as in a mile of main line. In fact, the rail section is frequently larger, for a road so prosperous as to require second, third or fourth track is likely to use a heavier section than is employed in building a single track road into a new and undeveloped country. Yard and terminal track is likely to involve the heaviest section.

A study of the statistics emphasizes the fact which has occasionally been referred to in very recent years, that the heaviest consumption of rails in the United States is now in replacing worn rails, whereas formerly the chief consumption was in building new road. The figures for the past two years make the following showing:

<i>Miles of New Track</i>		
	1912.	1913.
New road.....	2,997	3,071
Additional main line track.....	1,215	1,396
Total	4,212	4,467

On the basis of an average of 90-pound section, the rail consumption involved in the above indicated track would be 596,000 gross tons for 1912 and 632,000 tons for 1913.

Exports of rails amounted to 446,473 tons in 1912 and about 500,000 tons in 1913.

Rails used for industrial purposes cannot be estimated with extreme closeness, but as the quantity of rails produced in 1912 of less than

45-pound section was 248,672 tons, it is probably not far from the mark to estimate industrial rails at 300,000 tons. It should be remembered that some light rails are exported.

The laying of track for electric and other roads outside of standard steam roads is generally somewhat under 1500 miles a year and the total consumption of rails for such outside replacement purposes may be estimated at about 300,000 tons a year.

The 1912 rail production was 3,327,915 tons. Making the deductions indicated above there is left about 1,700,000 tons, which was apparently the consumption of rails by the steam roads for the purpose of replacement, and laying yard and siding track, but not main line track.

Prior to the past few years there were frequently years in which more than 10,000 miles of first and second track was laid. Until the beginning of the present century the great bulk of the rail output was consumed in the laying of new track. A very small quantity of rails was worn out, because, while there were many miles of track, the traffic was very light. Then there came suddenly a great increase in the weight of locomotives and cars, whereby old and light rails were rapidly worn out on many stretches of track, and these had to be replaced, their successors having in turn relatively long life. The high point in such replacement probably fell in 1906, the year which remains as the record one for rail production, with 3,977,887 tons turned out.

A few railroad systems have been reporting the tonnage of rails used annually for renewals, and on the basis of such statistics an estimate was made a few years ago that the wearing out of rails, with the amount of traffic then being carried, involved about 1,000,000 tons a year for ordinary replacements. The total freight ton-mileage of the country has since increased, but there are no very recent statistics indicating the extent of the increase. There is reason to believe, from the figures now available, that the replacement requirements have considerably increased, and are now fully 1,500,000 tons a year. This portion at least of the rail demand may be considered fairly steady and not dependent, in the long run, upon the flotation of new securities by the railroads.

A Curious Mistake in Figuring

The necessity of accuracy in minor details is strongly illustrated by a case decided in a New York court last week. The Thomas J. Buckley Engineering Company, which has done much work in subway building in New York City, brought suit to prevent the Public Service Commission from executing the Seventh avenue subway contract in favor of the Degnon Construction Company, on the ground that a clerk in transcribing the company's estimate for its bid made two mistakes which caused a difference of \$216,112 in the bid.

If the clerk had transcribed the figures correctly, the Buckley Company would have named an amount \$53,000 lower than the Degnon Company, to which the contract was awarded. It was shown to the court that the first error of the clerk consisted in inserting \$12 instead of 12 cents a pound for special wire forms, and the second was

ESTABLISHED 1855

THE IRON AGE

Published Every Thursday by the DAVID WILLIAMS CO., 239 West Thirty-ninth Street, New York

W. H. Taylor, *Pres. and Treas.*

Charles G. Phillips, *Vice-Pres.*

Fritz J. Frank, *Secretary*

M. C. Robbins, *Gen. Mgr.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: Equitable Building. Philadelphia: Real Estate Trust Building. Cleveland: New England Building. Cincinnati: Mercantile Library Building.

Subscription Price: United States and Mexico, \$5.00 per year; to Canada, \$7.50 per year; to other foreign countries, \$10.00 per year. Entered at the New York Post Office as Second-class Mail Matter.

EDITORS

GEO. W. COPE

A. I. FINDLEY

W. W. MACON

CHARLES S. BAUR, *Advertising Manager*

The Ford Profit Distribution

Comment upon the surprising announcement of a proposed distribution of profits among employees, made this week by the Ford Motor Company, of Detroit, may well wait upon further details of the plan. In outline the company's statement is that it will give its employees out of the profits of the coming year \$10,000,000, a portion going into each semi-monthly pay envelope; that to give employment to more men it will run 24 hours a day, substituting three eight-hour shifts for two of nine hours each; and that for men over 22 years of age \$5 will be the minimum wage for eight hours' work, employees worth more than that being paid according to their value. The proposal will be of particular interest to readers of *The Iron Age* in view of the article in our issue of January 1, 1914, describing the new system put in effect at the Ford works in October, designed to secure the highest skill and performance in the working force and continuity in its service to the company.

It is too much to hope that due weight will be given to President Ford's opinion that "this is not a plan for any company but ours." The success of the Ford enterprise puts its story beyond the pale of sober history and in a place of its own in the romance of industry. Scarcely less astonishing than the confidence with which \$20,000,000 profits for 1914 are already counted, with the business outlook far from brilliant, is the information thus given that \$100 net profit is realized on an automobile holding a place so uniquely low in the scale of prices. But these and all the other exceptional features of the Ford proposal, including its well-nigh prodigal generosity, are apt to make a smaller impression on many minds than the line of thought suggested by this single statement of the company's head:

We are in hopes that other employers will recognize the unequal distribution of earnings and endeavor in their own way to make a better division.

Ten thousand men struggling for jobs at the gates of the Ford works on the day after the plan was announced showed that one of the old economic laws was still at work—that labor, like capital, flows promptly in the direction of largest reward. But what is likely to be missed in the confused thinking that will now be widely heard from is that what labor and capital take out of an industry must be gauged by what they put into it. What

Mr. Ford says about the unequal distribution of earnings has been too true in many cases. There are notoriously underpaid employments. But today, in some industries, the pendulum is swinging the other way, and wrong interpretations of the Ford policy for 1914 will only intensify a condition under which proprietors and investors are faring hardly while labor enjoys the largest return it has ever had. We do not refer now to the handicaps under which many employers in the machinery trades have worked in recent years because of the exceptional wages paid by automobile companies. It is perhaps not inappropriate that an industry ministering largely to luxury and pleasure should become also labor's industry de luxe. The harm that will come from the popular interpretation of this week's announcement at Detroit is in the notion, to which the words above quoted will give some encouragement, that all employers can do better for their workmen. And more power will be given to the seeming belief that there is a strong box behind every establishment, from which wage advances can be taken when workmen conceive them to be necessary. The idea that the workman must himself create that which he asks to have awarded him is being lost in the maze of "social advance" which is now considered sufficient warrant for every demand made upon an employer.

Taking Advantage of a Slack Time

The slowing down of business has given managers of industrial works the opportunity to look into their properties with a view to putting them on a basis of high efficiency. This will result, in not a few cases, in a demand for new equipment to replace out-of-date machinery, or in securing a better balance between departments, or in a general increase in capacity. It is a factor which should figure in the next buying movement not very long after it makes a start, and many observers believe that time is not very far in the future.

The superintendent who is striving to the utmost to get out a maximum of product, under the constant hounding of the sales department, is compelled to neglect to some extent the scrutiny of details other than those which have to do with actual manufacturing. Under these conditions cost reductions are not followed up sharply. Sacrifices must be made, if necessary, for demand must be

met. The enforced neglect is liable to spread, showing itself in carelessness or procrastination in the keeping of records, in laxness in respect to the shop system and in various other ways. The reaction which comes with a sharp let-down in orders is more or less demoralizing in accentuating undesirable conditions in the plant routine.

When the manager and his assistants get down to the business of bringing the works back to normal, they usually find plenty to do. Recommendations of changes in the grouping of machinery, of new equipment and extensions, are studied with great care. Department heads are brought into the planning. In the beginning the improvements may be confined to rearrangement and other changes that require small outlay of money. Others follow, with improved financial conditions and a more hopeful outlook for business. Plans are made in detail, ready to be carried out at the right juncture. Evils that have crept into the cost or bonus or efficiency system are rooted out.

When business again revives and demand reaches a point calling for concentration upon output, the manager knows that his house is in order and that a basis of economic production has been re-established.

The Consumption of Rails

Through the annual compilation of the Railway Age Gazette statistics are now available of the mileage of new steam railroad track laid in 1913. For a number of years the Gazette has compiled statistics of the mileage of new road constructed, but the statistics are now made of special interest to the steel manufacturer by including the mileage of second, third and fourth track. The consumption of rails is substantially as large in a mile of subsidiary track as in a mile of main line. In fact, the rail section is frequently larger, for a road so prosperous as to require second, third or fourth track is likely to use a heavier section than is employed in building a single track road into a new and undeveloped country. Yard and terminal track is likely to involve the heaviest section.

A study of the statistics emphasizes the fact which has occasionally been referred to in very recent years, that the heaviest consumption of rails in the United States is now in replacing worn rails, whereas formerly the chief consumption was in building new road. The figures for the past two years make the following showing:

Miles of New Track

	1912.	1913.
New road.....	2,997	3,071
Additional main line track.....	1,215	1,396
Total	4,212	4,467

On the basis of an average of 90-pound section, the rail consumption involved in the above indicated track would be 596,000 gross tons for 1912 and 632,000 tons for 1913.

Exports of rails amounted to 446,473 tons in 1912 and about 500,000 tons in 1913.

Rails used for industrial purposes cannot be estimated with extreme closeness, but as the quantity of rails produced in 1912 of less than

45-pound section was 248,672 tons, it is probably not far from the mark to estimate industrial rails at 300,000 tons. It should be remembered that some light rails are exported.

The laying of track for electric and other roads outside of standard steam roads is generally somewhat under 1500 miles a year and the total consumption of rails for such outside replacement purposes may be estimated at about 300,000 tons a year.

The 1912 rail production was 3,327,915 tons. Making the deductions indicated above there is left about 1,700,000 tons, which was apparently the consumption of rails by the steam roads for the purpose of replacement, and laying yard and siding track, but not main line track.

Prior to the past few years there were frequently years in which more than 10,000 miles of first and second track was laid. Until the beginning of the present century the great bulk of the rail output was consumed in the laying of new track. A very small quantity of rails was worn out, because, while there were many miles of track, the traffic was very light. Then there came suddenly a great increase in the weight of locomotives and cars, whereby old and light rails were rapidly worn out on many stretches of track, and these had to be replaced, their successors having in turn relatively long life. The high point in such replacement probably fell in 1906, the year which remains as the record one for rail production, with 3,977,887 tons turned out.

A few railroad systems have been reporting the tonnage of rails used annually for renewals, and on the basis of such statistics an estimate was made a few years ago that the wearing out of rails, with the amount of traffic then being carried, involved about 1,000,000 tons a year for ordinary replacements. The total freight ton-mileage of the country has since increased, but there are no very recent statistics indicating the extent of the increase. There is reason to believe, from the figures now available, that the replacement requirements have considerably increased, and are now fully 1,500,000 tons a year. This portion at least of the rail demand may be considered fairly steady and not dependent, in the long run, upon the flotation of new securities by the railroads.

A Curious Mistake in Figuring

The necessity of accuracy in minor details is strongly illustrated by a case decided in a New York court last week. The Thomas J. Buckley Engineering Company, which has done much work in subway building in New York City, brought suit to prevent the Public Service Commission from executing the Seventh avenue subway contract in favor of the Degnon Construction Company, on the ground that a clerk in transcribing the company's estimate for its bid made two mistakes which caused a difference of \$216,112 in the bid.

If the clerk had transcribed the figures correctly, the Buckley Company would have named an amount \$53,000 lower than the Degnon Company, to which the contract was awarded. It was shown to the court that the first error of the clerk consisted in inserting \$12 instead of 12 cents a pound for special wire forms, and the second was

in inserting \$45 instead of 45 cents a linear foot for galvanized iron-pipe hand rails.

The court made the common-sense decision that no relief could be given, being of the opinion that the granting of the application might establish a precedent which would enable a bidder on a future contract for public work to deliberately specify what would seem unusually large prices for certain items with the idea that, if with those items he turned out to be the lowest bidder, he would take the contract, while if he was the second lowest bidder he would claim that a mistake had been made and demand the right to so correct his bid to make him the lowest bidder.

The errors made, as set forth in the suit, are of a character that would seem to one in the iron trade as almost impossible of commission. They are so egregiously incorrect, however, that perhaps that may be the reason why they were not observed by the higher officials of the company preparing the bids.

Public Sentiment a Potent Force

An important movement was begun January 1 in the announcement by J. P. Morgan & Co., New York, that members of that firm had retired from 30 directorships in 27 of the strongest corporations in which they were represented. Other large banking institutions are making similar announcements. This movement is in accordance with public sentiment regarding interlocking directorships. It is interesting to note that this is being done voluntarily, thus forestalling legislation which has been contemplated for the purpose of checking what has been assumed to be the control by a few great financial powers of important banking, railroad and industrial interests. It is in accordance with the disposition of large commercial interests to bow to the force of public sentiment as expressed in recent years. The public is thus securing obedience to its will without legislation in this as in other matters connected with the direction of great institutions, showing the progress of moral force. The man who defies public sentiment has become so scarce that the species is almost extinct.

Progress at the Tata Steel Works

Some details of the progress made at the works of the Tata Iron & Steel Company, Ltd., at Sakchi, Bengal, are contained in the seventh annual report, according to the London Iron and Coal Trades Review. The steel company has experienced many difficulties, and has not yet fulfilled expectations. The quality of the steel has improved and several thousand tons of rails have been passed by the Government inspector. Three grades of steel are being marketed as "British standard," which carries with it a certificate from the Government metallurgical inspector; "bazar," for material which just falls outside British standard specifications; and second class, or steel slightly defective on the surface. Production in the rolling mill has been low, owing to the shortcomings of the steel works, but "sufficient orders have been received to more than take care of its production." It is further stated that the mill has been favored with a standing yearly order for 20,000 tons of rails for the Indian State Railways.

CONTENTS

Forty Carbon Steel for Castings.....	129
Starrett Company's Profit-Sharing Plan.....	131
Steel Castings Direct from Iron Ore.....	132
A New Binder for Ore Briquettes.....	132
An 84-In. Reversible Planing Machine.....	133
Stone Roof for Modern Foundry.....	133
Universal Toolroom Lathe.....	134
Electric Smelting at Hardanger, Norway.....	135
Humphrey Gas Pump Tests.....	136
No German Invasion in Steel.....	137
A 17-In. Geared Head Lathe.....	138
Pneumatic Countersinking Machine.....	139
Estimated Metal Production for 1913.....	139
Gas Producer Developing 3000 Horse-Power.....	140
Two New Disk Grinding Machines.....	142
Water-Tube Boiler Space.....	143
Peat Production in Canada.....	143
Water-Cooled Sheet Mill Standing.....	144
Alloy Steels in Locomotive Construction.....	144
A New Electric Crane Limit Switch.....	145
A Year of Steady Declines in Great Britain.....	146
Heavy Melting Steel Scrap Prices at Pittsburgh.....	147
The Use of Stellite in the Machine Shop.....	148
Book Reviews.....	149
The Ford Profit Distribution.....	150
The Consumption of Rails.....	150
Taking Advantage of a Slack Time.....	151
A Curious Mistake in Figuring.....	151
Public Sentiment a Potent Force.....	152
Progress at the Tata Steel Works.....	152
Important Pending Legislation.....	153
Carnegie Annual Banquet.....	153
Awards of Prizes at Safety Exposition.....	153
Iron Ore Production in 1913.....	153
Many Furnaces Banked.....	154
New Woodward Coke Ovens.....	155
American Standard Fittings and Valves.....	155
The Iron and Metal Markets.....	156
Personal.....	169
Obituary.....	169
Pittsburgh and Valleys Business Notes.....	170
Blast Furnace Notes.....	171
Decline in Exports with Drawback Allowance.....	172
Many Plant Extensions in Cleveland District.....	174
New High-Speed Tool Plant.....	175
Railroad and Equipment Building in 1913.....	176
Change in a Veteran Iron House.....	176
American Shipbuilding in 1913.....	177
The Machinery Markets.....	178
Trade Publications.....	188

A new fuel for automobile and other internal combustion engines is announced by a British engineering journal. It has for its base 80 per cent. kerosene, the remainder being chemicals which form an emulsion. By distilling this mixture a fuel is obtained which is said to be cheaper than gasoline, and giving more power for the same motor. A further claim is that the combustion is so perfect that there is almost no carbon deposit in the cylinders, that there is no odor and the motor starts easily. The fuel is not yet on the market but a plant is being constructed to turn out 20,000,000 gal. a year.

A new metallic alloy of iron, manganese, aluminum and nickel has recently been patented by Walter Rubel, of Berlin, Germany. It is made by melting together the metals in proportions corresponding to the multiple of their atomic weights as expressed by the formula $4(\text{FeNi}) + 8\text{Al} + \text{Mn}$. It is claimed to be useful as an addition to copper and aluminum to form bronze.

Important Pending Legislation

WASHINGTON, D. C., January 7, 1914.—The managers and legal advisors of the great manufacturing corporations of the country, as well as lawyers and economists whose prominence entitles their opinions to weight, will be given an opportunity soon after Congress reconvenes, which will be January 12, to present their views regarding legislation necessary or desirable to supplement the Sherman act to the House Judiciary Committee, which has just concluded a preliminary hearing on certain anti-trust bills now pending before the House. These hearings are being held pursuant to a plan formulated at a conference between President Wilson and the majority members of the House and Senate judiciary committees. They involve the discussion of a considerable number of bills now pending before the House Committee. These measures will be supplemented soon after Congress reconvenes by a special message which President Wilson prepared before the convening of the present session, but which he withheld from his annual address to Congress for the reason that he did not wish to inject the anti-trust issue into the deliberations of the two houses until the then pending currency bill was finally disposed of. The new currency law is now on the statute books, and the President will, therefore, take up at once the subject of legislation supplementing the Sherman act, and will urge prompt action by Congress with the same energy that has characterized the Administration's campaigns for new tariff and currency laws.

Since the hearings on the anti-trust bills before the House Judiciary Committee were begun, many applications have been received from persons desiring to be heard. A considerable number of those who have requested the privilege of addressing the committee orally have indicated that they wish to present grievances against certain industrial corporations. To such applicants, however, the committee is stating that it is not the object of the hearings to draw out testimony with reference to abuses alleged to be practiced by the so-called trusts, but rather to afford an opportunity for those having remedial legislation to suggest to present their views in concrete form. The committee does not wish to hear any general academic discussion of the trust question, and will urge all witnesses to state their views as succinctly as possible. Proposed remedies presented in the form of specific provisions of law which, if acceptable to the committee, can be incorporated in the bill or bills to be formulated will be gladly received. Persons who may be unable to come to Washington but who wish to lay their views before the committee may present them in briefs or in less formal written form with the assurance that the committee will give them the same attention that will be accorded to oral arguments. With regard to the length of the hearings, it can be stated that the committee has not yet set a limit upon them.

It may be assumed that the measures to be reported by the House Judiciary Committee will deal chiefly with the definition of two important questions, namely, what constitutes a monopoly and what acts on the part of managers of great corporations may properly be held to be "in restraint of trade." Many minor points relating to conspiracies, interlocking directorates, rules of evidence, etc., will, of course, receive consideration, but the two points mentioned are regarded as the probable cornerstones of the projected supplemental legislation.

The American Federation of Labor is urging

with every means at its command the campaign recently set on foot to secure the incorporation of the so-called Bartlett-Bacon bill in the measure which the House Judiciary Committee will formulate. This bill specifically exempts all labor organizations, as well as organizations of agriculturists, from the operation of the Sherman law. The effort to secure such legislation is being quietly but strongly combated by associations of manufacturers and other employers, who hope to prevent the enactment of legislation discriminating in favor of one class of conspiracies as against another.

W. L. C.

Carnegie Annual Banquet

The seventeenth annual banquet of the officials of the Carnegie Steel Company and the heads of operating departments was held at the Hotel Schenley, Pittsburgh, Saturday evening, January 3. Covers were laid for 80. The honor guests were James A. Farrell, president of the United States Steel Corporation, and Frank E. House, president of the Duluth, Missabe & Northern Railroad. The toastmaster, A. C. Dinkey, president of the Carnegie Steel Company, introduced James L. O'Neill, manager of the credit department of the company, who spoke on "The Place of Credit in Business." James H. Grose, superintendent of the Ohio works at Youngstown, Ohio, was the next speaker, his subject being "Character Building in Steel Making." Charles C. Cluff, New York sales manager, spoke on "Romance of Salesmanship." Henry P. Bope, vice-president of the company, discussed "What Civilization Owes to Steel." Mr. Farrell also made a few remarks in the spirit of the occasion. It was regarded as one of the most successful company banquets yet held. A letter was read from Andrew Carnegie regretting his inability to be present.

Awards of Prizes at Safety Exposition

It is regrettable that some important omissions were made from the names of exhibitors in the metal trades and allied lines, as given on page 77 of *The Iron Age* of January 1, to whom prizes were awarded at the International Exposition of Safety and Sanitation, which closed at New York, December 20.

Included in the list of those to whom gold medals were awarded should have been the names of T. A. Willson & Co., Inc., Reading, Pa., and Templeton, Kenly & Co., Ltd., Chicago. T. A. Willson & Co. are makers of spectacles, eye protectors and goggles. Templeton, Kenly & Co. are manufacturers of iron and steel specialties.

Iron Ore Production in 1913

Between 58,000,000 and 60,000,000 gross tons of iron ore is the estimate of production for 1913, made by E. F. Burchard, of the United States Geological Survey. The largest previous output was 57,014,096 tons in 1910. Increases are reported in the Lake Superior district, the Birmingham district and New Jersey and New York, with slight decreases in Pennsylvania and the Rocky Mountain States.

The Buffalo Copper & Brass Rolling Mill, Buffalo, N. Y., has made arrangements for representation in the Middle West with A. C. Dallas & Sons, Inc., 223 North Jefferson street, Chicago. They will handle all of the products of the Buffalo Copper & Brass Rolling Mill, such as sheet copper, copper in rolls, copper flats and bottoms, copper anodes, sheet brass and brass rods and wire.

MANY FURNACES BANKED

A Sharp Decline in Pig-Iron Output

All Contributed by Steel Works Furnaces—
31,000,000 Tons in 1913.

Pig-iron production dropped off rapidly in the latter part of December. In addition to the blowing out of 15 furnaces in the month, more than 20, all of them steel works' stacks, were banked for 10 days or more at the end of the month. The production was 1,983,607 gross tons for the 31 days, or 63,987 tons a day, as against 2,233,603 tons in November, or 74,453 tons a day. We have not marked as out of blast, in any table below, furnaces which remained banked January 1, where the intention was that the furnace start up afresh after the holidays. It is indicated in our table showing furnaces in blast January 1, that a number of furnaces in important districts were out of blast on that day. There were about 20 furnaces of the Steel Corporation from which blast was held off between December 20 and January 1 inclusive. It was the plan to release this capacity after the holiday period; therefore, we have not classified these furnaces with those known to have been blown out last month.

The total pig-iron production of the country in 1913 may be estimated at 31,000,000 gross tons, and the probabilities are that the official figures will show no great variation from that figure.

DAILY RATE OF PRODUCTION

The daily rate of production of coke and anthracite pig iron by months, from December, 1912, is as follows:

Daily Rate of Pig-Iron Production by Months—Gross Tons			
	Steel works	Merchant	Total
December, 1912	63,770	25,996	89,766
January, 1913	63,921	26,251	90,172
February	64,005	28,364	92,369
March	61,448	27,699	89,147
April	64,658	27,101	91,759
May	64,232	26,807	91,039
June	62,002	25,617	87,619
July	59,362	23,239	82,601
August	59,140	22,981	82,121
September	60,941	22,590	83,531
October	59,630	22,503	82,153
November	52,434	22,019	74,453
December	41,879	22,108	63,987

OUTPUT BY DISTRICTS

The accompanying table gives the production of all coke and anthracite furnaces in December and the three months preceding:

Monthly Pig-Iron Production—Gross Tons				
	Sept. (30 days)	Oct. (31 days)	Nov. (30 days)	Dec. (31 days)
New York	178,882	158,288	180,198	111,493
New Jersey	10,800	11,236	11,298	11,790
Lehigh Valley	79,217	82,304	78,046	74,766
Schuylkill Valley	52,328	53,130	52,297	62,564
Lower Susquehanna and				
Lebanon Valley	48,713	50,766	41,032	39,871
Pittsburgh district	587,122	640,819	579,366	469,902
Shenango Valley	143,322	142,136	111,802	74,488
Western Pennsylvania	136,343	132,898	132,029	140,327
Maryland, Virginia and				
Kentucky	52,139	60,426	54,378	47,893
Wheeling district	109,057	106,462	80,097	78,633
Mahoning Valley	270,104	278,428	244,870	179,530
Central and Northern				
Ohio	222,930	228,619	169,213	162,702
Hocking Val., Hanging				
Rock and S. W. Ohio	34,798	37,966	42,561	49,415
Chicago district	345,338	326,973	284,641	247,031
Mich., Minn., Mo., Wis.				
and Col.	64,263	58,835	47,422	55,012
Alabama	157,254	161,365	160,011	161,554
Tennessee	13,317	15,610	14,342	16,636
Total	2,505,927	2,546,261	2,233,603	1,983,607

PRODUCTION OF STEEL COMPANIES

Returns from all furnaces of the United States Steel Corporation and the various independent steel

companies show the following totals of product month by month. Only steel-making iron is included in these figures, together with ferromanganese, spiegeleisen and ferrosilicon. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons								
	Pig, total production—			Spiegeleisen and ferromanganese				
	1911	1912	1913	1911	1912	1913		
Jan.	1,128,448	1,483,153	1,981,560	8,360	22,622	15,633		
Feb.	1,185,782	1,550,995	1,792,154	12,821	15,950	20,131		
Mar.	1,518,063	1,827,792	1,904,878	11,784	11,538	20,546		
Apr.	1,434,142	1,830,717	1,939,751	10,657	11,104	23,108		
May	1,310,378	1,922,557	1,991,192	13,641	20,518	19,042		
June	1,281,241	1,823,958	1,860,070	22,611	26,685	19,212		
July	1,316,646	1,803,205	1,840,216	17,067	26,522	22,310		
Aug.	1,460,610	1,843,404	1,833,352	14,579	24,225	20,680		
Sept.	1,490,898	1,773,073	1,828,232	17,757	22,484	24,555		
Oct.	1,560,884	1,947,426	1,848,634	19,697	27,252	19,499		
Nov.	1,452,907	1,884,524	1,573,007	19,678	17,461	26,765		
Dec.	1,453,446	1,976,870	1,298,262	20,068	18,523	14,095		

CAPACITY IN BLAST JANUARY 1 AND DECEMBER 1

The following table shows the daily capacity, in gross tons, of furnaces in blast January 1 and December 1 by districts. In some cases the estimates are only approximate, exact information not being available in every case as to the starting up on January 2 of furnaces banked over the holidays:

Coke and Anthracite Furnaces in Blast					
Location of furnaces	Total number of stacks	Jan. 1		Dec. 1	
		Number in blast	Capacity per day	Number in blast	Capacity per day
New York:					
Buffalo	19	10	3,204	10	3,245
Other New York			392		356
New Jersey	7	2	380	2	277
Pennsylvania:					
Lehigh Valley	22	8	2,278	10	2,510
Spiegel	2	1	86	1	83
Schuylkill Val.	16	8	2,018	8	1,927
Lower Susquehanna					
Hanna	7	2	490	3	660
Lebanon Val.	10	4	638	4	561
Pittsburgh Dist.	52	40*	16,865	41	18,025
Spiegel	4	2	244	3	427
Shenango Val.	19	8	2,580	10	3,230
Western Pa.	27	14	4,527	14	4,305
Maryland	4	1	290	2	575
Wheeling Dist.	14	7	2,633	7	2,640
Ohio:					
Mahoning Val.	25	15	5,987	19	7,725
Central and Northern					
Northern	24	16†	5,255	17	5,618
Hock'g Valley, Hanging Rock, & S. W. Ohio	15	11	1,560	11	1,610
Illinois and Ind.	34	19††	8,145	22	9,255
Spiegel	2	1	125	1	133
Mich., Wis. and Minn.	10	7	1,441	6	1,241
Colo. and Mo.	8	1	339	1	339
The South:					
Virginia	24	7	865	8	931
Kentucky	5	1	126	1	120
Alabama	46	21	5,163	21	5,315
Tennessee	20	4	537	3	478
Total	423	212	66,168	227	71,686

*12 of these furnaces still banked Jan. 1.

†3 of these furnaces still banked Jan. 1.

††3 of these furnaces still banked Jan. 1.

Among furnaces blown out in December were Crumwold and one Lock Ridge in the Lehigh Valley, one Paxton in the Lower Susquehanna Valley, one Aliquippa and Soho in the Pittsburgh district, Alice, New Castle No. 1 and one Farrell in the Shenango Valley, Oriskany in Virginia, one furnace of the Maryland Steel Company, Benwood furnace of the National Tube Company in the Wheeling district, one Ohio, Hannah, one Haselton, Tod, and one Youngstown Sheet & Tube Company in the Mahoning Valley, one stack of the Columbus Iron & Steel Company in Ohio, Belfont in the Hanging Rock district, two South Chicago, and one Gary in the Chicago district and one Pioneer in Alabama. In addition a good many furnaces remained banked on January 1, including four Carrie, one Clairton, one Duquesne, three Edgar Thomson and three Monongahela in the Pittsburgh district, three National Tube Company at Lorain, Ohio, and two South Chicago and one Gary in the Chicago district.

Furnaces blown in last month include Clinton in the Pittsburgh district, New Castle No. 3 in the Shenango Valley, Cherry Valley in the Mahoning

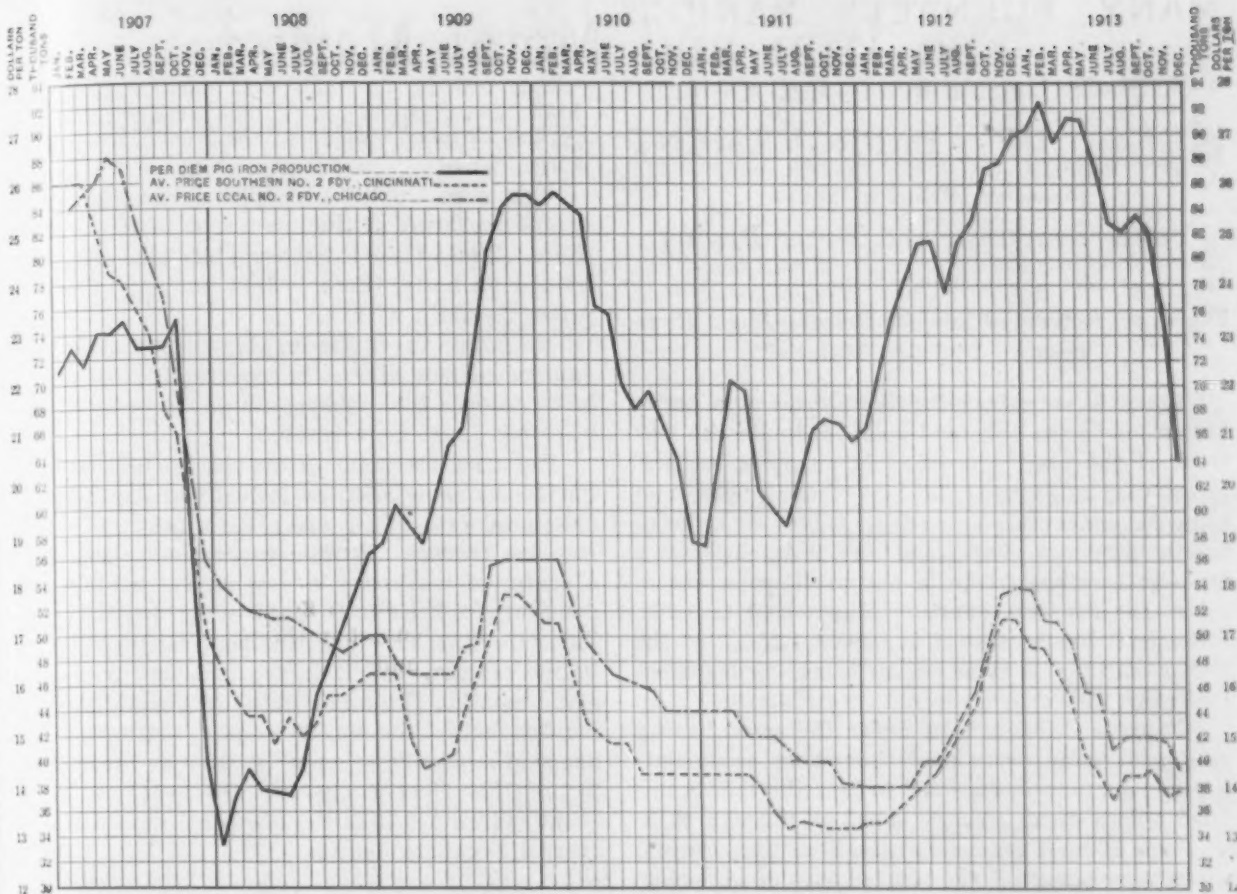


Diagram of Daily Average Production by Months of Coke and Anthracite Pig Iron in the United States from January 1, 1907, to January 1, 1914; Also of Monthly Average Prices of Southern No. 2 Foundry Iron at Cincinnati and Local No. 2 Foundry Iron at Chicago District Furnace

Valley, Globe in the Hanging Rock district, one Mayville in Wisconsin, the furnace of the Gulf States Iron & Steel Company in Alabama and Johnson City in Tennessee.

DIAGRAM OF PIG-IRON PRODUCTION AND PRICES

The fluctuations in pig-iron production from January, 1907, to the present time are shown in the accompanying chart. The figures represented by the heavy lines are those of daily average production, by months, of coke and anthracite iron. The two other curves on the chart represent monthly average prices of Southern No. 2 foundry pig iron at Cincinnati and of local No. 2 foundry iron at furnace at Chicago. They are based on the weekly market quotations of *The Iron Age*. The figures for daily average production are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1907—Gross Tons.

	1907.	1908.	1909.	1910.	1911.	1912.	1913.
Jan.	71,149	33,918	57,975	84,148	56,752	66,384	90,172
Feb.	73,038	37,163	60,976	85,616	64,090	72,442	92,369
Mar.	71,821	39,619	59,232	84,459	70,036	77,591	89,147
Apr.	73,885	38,289	57,962	82,792	68,836	79,181	91,759
May	74,048	37,603	60,753	77,102	61,079	81,051	91,039
June	74,486	36,444	64,656	75,516	59,585	81,358	87,619
July	72,763	39,287	67,793	69,305	57,841	77,738	82,601
Aug.	72,594	42,851	72,546	67,963	62,150	81,046	82,057
Sept.	72,783	47,300	79,507	68,476	65,903	82,128	83,531
Oct.	75,386	50,554	83,856	67,520	67,811	86,722	82,133
Nov.	60,937	51,595	84,917	63,659	66,648	87,697	74,453
Dec.	39,815	56,158	85,022	57,349	65,912	89,766	63,987

THE RECORD OF PRODUCTION

Production of Coke and Anthracite Pig Iron in the United States by Months Since January 1, 1909—Gross Tons

	1909	1910	1911	1912	1913
Jan.	1,797,560	2,608,695	1,759,326	2,057,911	2,795,331
Feb.	1,797,340	2,397,354	1,794,509	2,100,815	2,586,337
Mar.	1,832,194	2,617,949	2,171,111	2,405,318	2,763,563
Apr.	1,738,877	2,493,753	2,064,086	2,275,436	2,752,761
May	1,883,330	2,390,130	1,893,456	2,512,582	2,822,217
June	1,930,866	2,265,473	1,787,566	2,440,745	2,628,565
July	2,103,431	2,148,442	1,793,068	2,410,889	2,560,646
Aug.	2,248,930	2,106,847	1,926,637	2,512,431	2,543,763
Sept.	2,385,206	2,056,275	1,997,102	2,463,829	2,505,927
Oct.	2,599,541	2,093,121	2,102,147	2,689,938	2,546,261
Nov.	2,547,508	1,909,780	1,999,423	2,630,854	2,233,123
Dec.	2,635,680	1,777,817	2,048,270	2,782,737	1,983,607

New Woodward Coke Ovens

The Woodward Iron Company has decided to add to its by-product coke oven plant at Woodward, Ala., and has just given a second repeat order to the H. Koppers Company, Chicago. The addition will consist of 30 ovens. Work will begin in the near future, and it is expected to have the ovens in operation in August. The Woodward Iron Company will not enter on the manufacturing of creosoting oils, as has been reported in some papers. A plant will be built at Woodward, however, by the American Creosoting Company and the Woodward Iron Company will supply the tar from which the creosoting oils will be produced. The additional ovens will give the Woodward Iron Company a total of 170, each having a capacity of 13¼ tons.

American Standard Fittings and Valves

At a meeting of the Committee of Manufacturers on Standardization of Fittings and Valves, held at 30 Church street, New York City, December 17, the following resolution was adopted:

Resolved, That the schedule which was adopted by this committee on September 17, 1913, and which was reported by the committee of the American Society of Mechanical Engineers on standardization of flanges, at its annual meeting held December 3, 1913 (which subject is held over for their next regular meeting), be concurred in and reaffirmed to take effect, as originally planned, on January 1, 1914.

Notices posted in the car shops of the New York, New Haven & Hartford Railroad announce, effective January 3, a reduction of 10 per cent. in the wages of machinists, boilermakers, steamfitters and carworkers.

The Iron and Metal Markets

SIGNS OF IMPROVEMENT

Better Sentiment and Better Buying

Pig Iron Active at Lowest Prices—More Firmness on Finished Material

There is no gainsaying the spread of a better sentiment in the iron and steel trades in the first week of the year. Its effect in enlarged business is not easy to measure, in view of the quietness of some consumers in maneuvering for low-priced contracts. In plates, shapes and bars, it develops, some mills sold rather freely in the past two weeks at 1.15c. for the first quarter; others held to 1.20c. Latterly it has been hard to buy at 1.15c., and the firmer attitude of some sellers is having its effect generally.

There is evidence that under the small buying of a good many weeks needs have been accumulating and January is expected to turn the tide in unfilled orders which steadily ebbed all through 1913.

Some 20 blast furnaces of the Steel Corporation, which were banked in the last ten days of December to prevent piling pig iron, have started up, and rolling mill schedules have been increased. The tin plate mills of the Steel Corporation are now running at 88 per cent. of capacity and sheet mills at 75 per cent., with the prospect of a continuance of these rates.

Our pig iron statistics for December reflect the sharp contraction in output last month. The total was 1,983,607 gross tons, or 63,987 tons a day, against 2,233,603 tons in November, or 74,453 tons a day. It was the smallest month's output since that of August, 1911. The output of steel works furnaces fell off about 10,600 tons a day, while that of merchant furnaces increased by 100 tons a day. For the 212 furnaces active January 1 (including furnaces banked which resumed January 2) the capacity figures, based in part on low December performance, were 66,168 tons a day, against 227 furnaces and 71,686 tons a day on December 1.

Based on the December returns we estimate the pig iron production of 1913 at 31,000,000 tons, allowing 160,000 tons for the charcoal iron output of the second half.

In view of what has been held back for months, railroad buying will be heavy after the rate decision, whatever it may be. The total of rail buying by the New York Central and allied lines is put at 220,000 tons, of which 100,000 tons went to Buffalo. At Chicago 200,000 tons of rails and car building material is under negotiation.

Fabricating companies have held off contracting for first quarter material, using such business as leverage to get as low prices on second quarter deliveries. The mills are generally refusing to sell that far ahead at to-day's prices—a stand that is still a marvel in some quarters in the light of the history of all slack times. Fabricating work is developing slowly. The Phoenix Bridge Company was low bidder at \$48 a ton on 13,500 tons

for the elevated section of the New York Subway work, known as the Liberty avenue extension.

The wire market shows that some manufacturers are tiring of the low prices long prevailing there. While \$1.50 Pittsburgh has been commonly quoted on nails, there is less tendency to shade prices on plain wire.

On boiler tubes the leading manufacturer has announced new discounts representing reductions of \$2 to \$4 a ton. Discounts on oil country supplies have also been revised.

Pig iron markets all report greater activity, but prices have been the lowest seen on the present movement. They are plainly drawing buyers into the market. Buffalo in particular has been a center of weakness, as low as \$12 having been done on No. 2 iron. A good many large foundry interests have bought in the past fortnight or are in the market, and it is the broadest buying in many months. Pipe interests are negotiating, one inquiry being for 60,000 tons. Southern basic has sold at \$10.50, sales of 18,000 tons being made to an Ohio river company. On Southern No. 2 foundry iron \$10.75 is the low price reported from several Northern centers.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous.	Jan. 7, 1914.	Dec. 31, 1913.	Dec. 10, 1913.	Jan. 8, 1913.
Pig Iron, Per Gross Ton:	1914.	1913.	1913.	1913.
No. 2 X, Philadelphia...	\$14.85	\$15.00	\$15.25	\$18.50
No. 2, Valley furnace...	13.00	13.00	13.50	17.50
No. 2 Southern, Cin'ti...	14.00	13.75	14.25	17.25
No. 2, Birmingham, Ala.	10.75	10.50	11.00	14.00
No. 2, furnace, Chicago*	14.00	14.00	14.75	18.00
Basic, del'd, eastern Pa.	14.00	14.00	15.00	18.25
Basic, Valley furnace...	12.50	12.50	12.75	16.50
Bessemer, Pittsburgh...	15.15	15.15	15.90	18.15
Malleable Bess., Ch'go...	14.00	14.00†	14.75	18.00
Gray forge, Pittsburgh...	13.90	13.90	13.90	17.15
L. S. charcoal, Chicago...	15.25	15.25	15.25	18.00
Billets, etc., Per Gross Ton:				
Bess. billets, Pittsburgh...	20.00	20.00	20.00	28.50
O.-h. billets, Pittsburgh...	20.00	20.00	20.00	29.00
O.-h. sheet bars, P'gh...	21.00	21.00	21.00	29.50
Forging billets, P'gh...	24.00	24.00	24.00	36.00
O.-h. billets, Phila...	21.50	21.50	22.40	32.00
Wire rods, Pittsburgh...	25.00	25.00	25.00	30.00
Old Material, Per Gross Ton:				
Iron rails, Chicago...	13.00	13.00	13.00	17.25
Iron rails, Phila...	15.50	15.50	15.50	18.00
Carwheels, Chicago...	11.50	11.50	12.00	17.00
Carwheels, Philadelphia...	12.00	12.00	12.00	16.25
Heavy steel scrap, P'gh...	10.50	10.50	11.00	15.00
Heavy steel scrap, Phila...	10.00	10.00	10.00	14.50
Heavy steel scrap, Ch'go...	9.00	9.00	9.00	12.75
No. 1 cast, Pittsburgh...	10.75	10.75	12.00	14.50
No. 1 cast, Philadelphia...	12.00	12.00	12.00	15.00
No. 1 cast, Ch'go (net ton)	10.00	10.00	9.75	13.00
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bess. rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia...	1.20	1.22½	1.25	1.77
Iron bars, Pittsburgh...	1.35	1.35	1.35	1.70
Iron bars, Chicago...	1.10	1.10	1.15	1.57½
Steel bars, Pittsburgh...	1.20	1.20	1.20	1.70
Steel bars, New York...	1.36	1.36	1.36	1.86
Tank plates, Pittsburgh...	1.20	1.20	1.20	1.75
Tank plates, New York...	1.36	1.36	1.36	1.91
Beams, etc., Pittsburgh...	1.20	1.20	1.25	1.75
Beams, etc., New York...	1.36	1.31	1.41	1.91
Skelp, grooved steel, P'gh...	1.20	1.20	1.20	1.45
Skelp, sheared steel, P'gh...	1.30	1.30	1.30	1.50
Steel hoops, Pittsburgh...	1.35	1.35	1.40	1.50
Sheets, Nails and Wire,				
Per Lb. to Large Buyers:				
Sheets, black, No. 28, P'gh	1.85	1.85	1.90	2.25
Galv. sheets, No. 28, P'gh	2.85	2.85	2.90	3.40
Wire nails, Pittsburgh...	1.50	1.55	1.55	1.75
Cut nails, f.o.b. East'n mills	1.65	1.65	1.65	1.75
Cut nails, Pittsburgh...	1.55	1.55	1.55	1.70
Fence wire, base, P'gh...	1.30	1.35	1.35	1.55
Barb wire, galv., P'gh...	1.90	1.95	1.95	2.15

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

†The quotation of \$14.50 last week was an error.

Coke, Connellsville,

	Jan. 7, 1914.	Dec. 31, 1913.	Dec. 10, 1913.	Jan. 8, 1914.
Per Net Ton at Oven:	1914.	1913.	1913.	1913.
Furnace coke, prompt....	\$1.85	\$1.85	\$1.75	\$4.00
Furnace coke, future....	2.00	2.00	1.80	3.25
Foundry coke, prompt....	2.50	2.50	2.50	4.50
Foundry coke, future....	2.60	2.60	2.60	3.75

Metals.

Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.	15.12½	15.12½	15.00	17.75
Electrolytic copper, N. Y.	14.87½	14.87½	14.37½	17.62½
Spelter, St. Louis.....	5.15	5.20	5.00	7.17½
Spelter, New York.....	5.30	5.35	5.15	7.30
Lead, St. Louis.....	4.05	4.10	3.85	4.20
Lead, New York.....	4.15	4.15	4.00	4.35
Tin, New York.....	36.60	37.37½	37.50	50.45
Antimony, Hallett's, N. Y.	7.00	7.00	7.00	9.37½
Tin plate, 100-lb. box, P'gh.	\$3.40	\$3.40	\$3.40	\$3.60

Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh, in carloads, per 100 lb., New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 42½c.; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier, 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.20c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers with extras:

Rectangular plates, tank steel or conforming to manufacturer's standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ½ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras.	Cents per lb.
Gauges under ¼ in. to and including 3-16 in.....	.10
Gauges under 3-16 in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10.....	.30
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including straight taper plates) 3 ft. and over.....	.10
Complete circles 3 ft. in diameter and over.....	.20
Boiler and flange steel.....	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel.....	.30
Marine steel.....	.40
Locomotive firebox steel.....	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 125 in., inclusive.....	.15
Widths over 125 in. up to 130 in., inclusive.....	.25
Widths over 130 in.....	.50
Cutting to lengths, under 3 ft., to 2 ft. inclusive.....	.25
Cutting to lengths, under 2 ft., to 1 ft. inclusive.....	.50
Cutting to lengths, under 1 ft.....	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zeos, 3 in. and over, 1.20c. to 1.25c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.....	.10
H-beams over 18 in.....	.10
Angles over 6 in. on one or both legs.....	.10
Angles, 3 in. on one or both legs, less than ¼ in. thick as per steel bar card, Sept. 1, 1909.....	.70
Tees, structural sizes (except elevator, hand rail, car-truck and conductor rail).....	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909.....	.20 to .80
Deck beams and bulb angles.....	.30
Hand rail tees.....	.75
Cutting to lengths, under 3 ft., to 2 ft. inclusive.....	.25
Cutting to lengths, under 2 ft., to 1 ft. inclusive.....	.50
Cutting to lengths, under 1 ft.....	1.55

No charge for cutting to lengths 3 ft. and over.

Wire Rods.—Bessemer, open-hearth and chain rods, \$25 to \$25.50.

Wire Products.—Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers; annealed, \$1.30 to \$1.35; galvanized, \$1.70 to \$1.75. Galvanized barb wire and fence staples, to jobbers, \$1.90 to \$1.95; painted, \$1.50 to \$1.55. Wire nails to jobbers, \$1.50 to \$1.55. Prices of the foregoing wire products to dealers, in carload lots, are 5c. higher. Woven wire fencing, 74½ per cent. off list for carloads; 73½ off for 1000-rod lots; 72½ off for less than 1000-rod lots.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

	Plain Wire, per 100 lb.									
Nos.	0 to 9	10	11	12	13	14	15	16		
Annealed	\$1.55	\$1.60	\$1.65	\$1.70	\$1.80	\$1.90	\$2.00	\$2.10		
Galvanized	2.00	2.00	2.05	2.10	2.20	2.30	2.70	2.80		

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe in effect from October 27, 1913, and iron pipe from June 2, 1913, all full weight:

Butt Weld					
Inches.	Steel.	Black	Galv.	Inches.	Iron.
1/4, 1/2 and 3/4	73	52½	1/4 and 1/2	66	47
1/2	77	66½	3/4	65	46
3/4 to 3	80	71½	1/2	69	56
			3/4 to 2½	72	61

Lap Weld					
2	77	68½	1 1/4	56	45
2½ to 6	79	70½	1 1/2	67	56
7 to 12	76	65½	2	68	58
13 to 15	53		2½ to 4	70	61
			4½ to 6	70	61
			7 to 12	68	55

Reamed and Drifted					
1 to 3, butt	78	69½	1 to 1½, butt	70	59
2, lap	75	66½	2, butt	70	59
2½ to 6, lap	77	68½	1 1/4, lap	54	43
			1 1/2, lap	65	54
			2, lap	66	56
			2½ to 4, lap	68	59

Butt Weld, extra strong, plain ends					
1/4, 1/2 and 3/4	68	57½	3/4	63	52
1/2	73	66½	1/2	67	60
3/4 to 1½	77	70½	3/4 to 1½	71	62
2 to 3	78	71½	2 and 2½	72	63

Lap Weld, extra strong, plain ends					
2	74	65½	1 1/4	65	59
2½ to 4	76	67½	2	66	58
4½ to 6	75	66½	2½ to 4	70	61
7 to 8	68	57½	4½ to 6	69	60
9 to 12	63	52½	7 and 8	63	53
			9 to 12	58	47

Butt Weld, double extra strong, plain ends					
1/4	63	56½	1/4	57	49
3/4 to 1½	66	59½	3/4 to 1½	60	52
2 to 2½	68	61½	2 and 2½	62	54

Lap Weld, double extra strong, plain ends					
2	64	57½	2	55	49
2½ to 4	66	59½	2½ to 4	60	54
4½ to 6	65	58½	4½ to 6	59	53
7 to 8	58	47½	7 to 8	52	42

To the large jobbing trade an additional 5 and 2½ per cent. is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers, in carloads on lap-welded steel, in effect from January 2, 1914, and standard charcoal-iron boiler tubes, in effect from January 1, 1913, are as follows:

Lap-Welded Steel		Standard Charcoal Iron	
1½ and 2 in.....	61	1½ in.....	44
2½ in.....	58	1½ and 2 in.....	48
2½ and 2½ in.....	64	2½ in.....	44
3 and 3½ in.....	69	2½ to 2½ in.....	53
3½ and 4½ in.....	71	3 and 3½ in.....	55
5 and 6 in.....	64	3½ to 4½ in.....	58
7 to 13 in.....	61	Locomotive and steamship special grades bring higher prices.	

2½ in. and smaller, over 18 ft., 10 per cent. net extra.

2½ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft., and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points.

Sheets.—Makers' prices for mill shipment on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets		Cents per lb.	
Nos. 3 to 8	.....	1.40 to 1.45	
Nos. 9 and 10	.....	1.45 to 1.50	
Nos. 11 and 12	.....	1.50 to 1.60	
Nos. 13 and 14	.....	1.55 to 1.65	
Nos. 15 and 16	.....	1.65 to 1.70	

Box Annealed Sheets, Cold Rolled		Cents per lb.	
Nos. 10 and 11	.....	1.50 to 1.60	
No. 12	.....	1.50 to 1.60	
Nos. 13 and 14	.....	1.55 to 1.65	
Nos. 15 and 16	.....	1.60 to 1.70	
Nos. 17 to 21	.....	1.65 to 1.75	
Nos. 22 and 24	.....	1.70 to 1.80	
Nos. 25 and 26	.....	1.75 to 1.85	
No. 27	.....	1.80 to 1.90	
No. 28	.....	1.85 to 1.95	
No. 29	.....	1.90 to 2.00	
No. 30	.....	2.00 to 2.10	

Galvanized Sheets of Black Sheet Gauge

Nos. 10 and 11	1.85 to 1.95
No. 12	1.95 to 2.05
Nos. 13 and 14	1.95 to 2.05
Nos. 15 and 16	2.10 to 2.20
Nos. 17 to 21	2.25 to 2.35
Nos. 22 and 24	2.40 to 2.50
Nos. 25 and 26	2.55 to 2.65
No. 27	2.70 to 2.80
No. 28	2.85 to 2.95
No. 29	3.00 to 3.10
No. 30	3.15 to 3.25

Pittsburgh

PITTSBURGH, PA., January 7, 1914.

The feeling in the steel trade is better, with a decided improvement in the demand. Even some betterment in prices is expected before this month is out. There is more active inquiry for pig iron than for some months; prices, however, are very low. The reduction of \$2 a ton on some sizes and \$4 on other sizes of welded boiler steel tubes had been expected by the trade, as former discounts were being materially shaded. There is a better demand for sheets. Some important contracts for coke have been placed, and three or four of what are regarded as the best makes of furnace coke are being held at \$2 at oven. Mill operations are on a slightly heavier basis than in December, particularly the sheet and tin-plate mills. The demand for finished products is still largely of a hand-to-mouth nature, but the opinion is growing that prices have about touched bottom. There is more resistance by the mills to naming lower prices, and some business is being turned down because the figures offered by buyers are too low.

Pig Iron.—W. P. Snyder & Co. report the average price of Bessemer pig iron in December to have been \$14.842, and basic \$12.52, both at Valley furnace. The reduction on Bessemer over November was 28c. and on basic about 50c. Basic iron for first quarter shipment is being freely offered at \$12.50, Valley furnace, and possibly this might be slightly shaded. The Standard Sanitary Mfg. Company has bought 2000 tons of No. 2 Southern foundry at \$10.75 and 750 tons of No. 3 at \$10.25, Birmingham, for delivery to its works at Louisville, Ky.; it is also credited with having bought about 2000 tons of Northern No. 2 foundry at about \$12.75, Valley furnace. We quote standard Bessemer iron at \$14.25 and basic \$12.50 for first quarter delivery; No. 2 foundry, \$12.75 to \$13, some sellers refusing to shade the latter figure; malleable Bessemer, \$12.75 to \$13; gray forge, nominally \$13, all at Valley furnace, the freight rate for delivery in the Pittsburgh district being 90c. a ton.

Billets and Sheet Bars.—The market is quiet but stronger. Leading steel makers are reported holding firmly for prices quoted below. A good many consumers have covered for the first quarter, and shipments to sheet and tin-plate mills are heavier than for some time. We quote Bessemer and open-hearth billets at \$20 and Bessemer and open-hearth sheet bars at \$21, maker's mill, Pittsburgh or Youngstown. We quote forging billets at \$24 and axle billets \$23, Pittsburgh.

Muck Bar.—In the absence of sales, we quote best grades, made from all pig iron, at \$29 per gross ton, f.o.b., Pittsburgh.

Steel Rails.—No important contracts for standard sections have been taken by local makers in the past week, but some large orders are expected to be placed this month. The new demand for light rails is fair but not so active as some time ago. The Carnegie Steel Company received new orders and specifications in the past week for about 2500 tons. We quote splice bars at 1.50c. and standard section rails at 1.25c. Light rails, rolled from billets, are quoted as follows: 25, 30, 35, 40 and 45 lb. sections, 1.25c.; 16 and 20 lb., 1.30c.; 12 and 14 lb., 1.35c. and 8 and 10 lb., 1.40c., all in carload lots, f.o.b., Pittsburgh.

Plates.—It is reported that the Union Pacific is about to place orders for 5000 box and other cars and the Canadian Northern and Grand Trunk for about 3500 cars, but the reports cannot be verified. The new demand for plates is dull, and mills are badly in need

of more business. We quote ¼-in. and heavier plates at 1.20c., f.o.b., Pittsburgh, but on a very attractive order this price might be shaded \$1 a ton.

Structural Material.—New inquiry is only fairly active. The McClintic-Marshall Company has taken 1600 tons for a new freight station for the Pennsylvania Lines West on Federal street, North Side; 400 tons for new buildings for the Beacon Mfg. Company, New Bedford, Mass.; 600 tons for new buildings for the Chicago Railway Equipment Company, and 800 tons of bridge work for the New York State Highways Department. We quote beams and channels up to 15 in. at 1.20c. for desirable orders and 1.25c. for small lots.

Wire Rods.—The demand is quiet, and consumers are not specifying freely against contracts. We quote Bessemer, open-hearth and chain rods at \$25, Pittsburgh, for desirable orders, and \$25.50 for small lots.

Skelp.—A sale is reported of about 1000 tons of narrow sizes of grooved skelp at 1.20c., maker's mill. The market is fairly strong, but the new demand is quiet. We quote grooved steel skelp at 1.20c. to 1.25c.; sheared steel skelp, 1.30c. to 1.35c.; grooved iron skelp, 1.55c. to 1.60c.; and sheared iron skelp at 1.60c. to 1.65c., Pittsburgh.

Iron and Steel Bars.—The new demand for both iron and steel bars is quiet. Specifications against contracts are not coming in freely. It is stated that some Swedish bars have been sold for delivery near Boston, Mass., at 1.24c. delivered. The demand for reinforcing steel bars is heavy, and prices are reported firm. We quote steel bars at 1.20c. for first quarter delivery, but on very desirable business this price might be shaded \$1 a ton. We quote common iron bars at 1.35c. to 1.40c., Pittsburgh.

Sheets.—Makers report conditions in this trade distinctly better. Orders are coming in more freely, specifications against contracts are good, and the tone of prices is stronger. One large interest states that its orders for sheets in December were as heavy as in any previous December in its history. Consumers are showing more desire to get under cover. Prices on No. 28 Bessemer black sheets for prompt shipment are 1.85c. and on No. 28 galvanized 2.85c., but makers state these prices would not be accepted on contracts for first quarter, several reporting the receipt of contracts for first quarter at 1.90c. to 1.95c. for 28 black and 2.90c. to 2.95c. for 28 galvanized. We therefore quote on the above basis. We quote Nos. 9 and 10 blue annealed sheets at 1.40c. prompt and 1.45c. for first quarter; No. 28 tin mill black plate, H. R. and A., 1.85c. to 1.90c. and Nos. 29 and 30 at 1.90c. to 1.95c. These prices are f.o.b., Pittsburgh, in carload and larger lots, jobbers charging the usual advances for small lots from store.

Tin Plate.—It is said that all but one of the leading consumers have practically covered on their requirements for 1914. Specifications are coming in quite freely, and operations among tin plate mills are on a heavier basis than for some time, several leading mills running from 75 to 80 per cent. of capacity. It is stated that the outlook for a heavy consumption of tin plate this year is good. Makers also report that specifications against contracts for terne plate are coming in more freely, jobbers desiring to accumulate stocks to meet the expected spring demand. The nominal price of 100-lb. cokes is \$3.40.

Shafting.—Orders are reported a little better, and specifications are also slightly improved. The automobile trade is reported dull, many leading builders of cars running 50 per cent. or less, and as a result specifications for shafting from this class of consumers are unsatisfactory, as they have been for several months. We quote cold-rolled shafting in carload and larger lots at 64 to 65 per cent. off, and in small lots 62 to 63 per cent. off delivered in base territory.

Bolts and Rivets.—The new demand is moderate, being still confined mostly to small lots to cover actual needs. A heavier buying movement is expected in the near future. The new demand for rivets is reported but slightly better and prices are only fairly strong. We quote button-head structural rivets at \$1.70 and

cone-head boiler rivets at \$1.80 in carload lots, about \$2 a ton advance over these prices being charged for small lots. Terms are 30 days, net, less 2 per cent. for cash in 10 days. Discounts on nuts and bolts, which are being more or less shaded, are as follows in lots of 300 lb. or over, delivered within a 20c. freight radius of makers' works.

Cone and lag screws.....	80 and 20% off
Small carriage bolts, cut threads.....	75 and 17 1/2% off
Small carriage bolts, rolled threads.....	80 and 2 1/2% off
Large carriage bolts.....	70 and 15% off
Small machine bolts, cut threads.....	80 and 2 1/2% off
Small machine bolts, rolled threads.....	80 and 7 1/2% off
Large machine bolts.....	75 and 10 and 2 1/2% off
Machine bolts, C.P.C. & T nuts, small.....	70 and 12 1/2% off
Machine bolts, C.P.C. & T nuts, large.....	70 and 12 1/2% off
Square hot pressed nuts, blanked and tapped.....	\$6.00 off list
Hexagon nuts.....	\$6.70 off list
C.P.C. and R square nuts, tapped and blanked.....	\$5.80 off list
Hexagon nuts, 5/8 and larger.....	\$6.80 off list
Hexagon nuts, smaller than 9/16.....	\$7.40 off list
C.P. plain square nuts.....	\$5.30 off list
C.P. plain hexagon nuts.....	\$5.70 off list
Semi-finished hexagon nuts, 5/8 and larger.....	85 and 10% off
Semi-finished hex. nuts, smaller than 9/16.....	85, 10 and 5% off
Rivets, 7/16 x 6 1/2, smaller and shorter.....	80 and 10% off
Rivets, metallic tinned, bulk.....	80 and 10% off
Rivets, tin plated, bulk.....	80 and 10% off
Rivets, metallic tinned, packages.....	80 and 10% off
Standard cap screws.....	75, 10, 10 and 7 1/2% off
Standard set screws.....	75, 10, 10 and 7 1/2% off

Hoops and Bands.—New business is light. Most consumers are covered by contracts, on which specifications are fair. We quote steel bands at 1.20c., with extras as per the steel bar card, and hoops at 1.35c., maker's mill.

Wire Products.—This is the off season in the wire trade and the new demand is only for small lots. Jobbers have not yet commenced to specify freely against contracts, and therefore shipments by the mills are light. We quote wire nails to jobbers at \$1.50 to \$1.55; cut nails, \$1.55; annealed wire, \$1.30 to \$1.35; galvanized barb wire and fence staples, \$1.90 to \$1.95; painted barb wire, \$1.50 to \$1.55, f.o.b., Pittsburgh, per 100 lb., usual terms, actual freight added to point of shipment. It is stated that prices on wire are stronger than on wire nails. We quote woven wire fencing at 74 1/2 per cent. off in carload lots; 73 1/2 per cent. off on 1000-rod lots, and 72 1/2 per cent. on less than 1000-rod lots, all f.o.b. Pittsburgh.

Railroad Spikes.—Inquiries from the railroads are heavy, but the amount of business so far placed has been a disappointment to the makers. Several roads that inquired for 5000 to 10,000 kegs have bought only half. Railroads are trying to place contracts for the entire year at present prices, but makers state they are refusing to sell so far ahead on this level. We quote railroad spikes in large lots at \$1.45 and in carloads at \$1.50; small railroad and boat spikes, \$1.55 per 100 lb., f.o.b., Pittsburgh.

Merchant Steel.—The demand continues quiet and only for small lots and prices are still being more or less shaded. Nominal prices on small lots are as follows: Iron finished tire, 1/2 x 1 1/2 in., and larger, 1.35c., base; under 1/2 x 1 1/2 in., 1.50c.; planished tire, 1.55c.; channel tire, 3/4 to 7/8 and 1 in., 1.85c. to 1.95c.; 1 1/2 in. and larger, 1.95c.; toe calk, 1.95c. to 2.05c., base; flat sleigh shoe, 1.70c.; concave and convex, 1.75c.; cutter shoe, tapered or bent, 2.25c. to 2.35c.; spring steel, 1.95c. to 2.05c.; machinery steel, smooth finish, 1.80c. We quote cold-rolled strip steel as follows: Base rates for 1 in. and 1 1/2 in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.25c.; soft, 3.50c.; coils, hard, 3.15c.; soft, 3.40c.; freight allowed. The usual differentials apply for lighter sizes.

Standard Pipe.—The new demand for lap and butt weld black and galvanized pipe is holding up fairly well, but will probably show a falling off for the next two or three months, owing to the fact that a good deal of outside work has stopped. Most of the leading mills are well covered with orders for 60 days. It is stated that discounts on both iron and steel pipe are being quite well maintained.

Boiler Tubes.—The unevenness in prices on boiler tubes, which has existed for some months, is emphasized by the new card of discounts, issued under date

of January 2 by the National Tube Company, and which has been adopted by the other tube makers. On all sizes of lap-welded steel boiler tubes up to 3 in., and from 5 up to 13 in., discounts have been increased one point, or a reduction of \$2 a ton, while on 3 up to 4 1/2 in. discounts were increased two points, or a reduction of about \$4. The new card on steel boiler tubes is identical with that in effect January 1, 1913. The pipe mills have also issued new lists on oil country goods, in which new prices per foot have been named on all sizes of casing, which average about \$2 a ton reduction, and on nearly all sizes of drive pipe and tubing the prices show a reduction of close to \$2. Prices on line pipe were not changed. The new demand for boiler tubes is only fair, but it is believed that the new discounts just put out will have the effect of steadying the market.

Old Material.—General conditions are reported by some dealers to be slightly better. Some new demand has come out for heavy melting scrap, mostly from a new consumer in the Youngstown, Ohio, district, and there is also some new demand for borings and turnings from consumers that have not been buying for some months. Sales of 1000 tons of turnings at \$6.50 to \$6.75 and 1000 tons of borings at \$7.50 to \$7.75 are reported. We also note sales of 1500 to 2000 tons of heavy melting scrap at \$10.50, delivered at buyer's mill in the Youngstown district. A meeting of dealers in the Pittsburgh district was held last evening at the Hotel Henry in this city, for the purpose of forming a branch organization of the Association of Waste Material Dealers. It is said the new association, if formed, will not in any way endeavor to control the prices of scrap, but will try to correct some abuses that have crept into the trade. Prices on borings and turnings have advanced about 25c. per ton. Dealers are quoting about as follows per gross ton for delivery in the Pittsburgh and other districts:

Selected heavy steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivery.....	\$10.50 to \$10.75
Compressed side and end sheet scrap.....	9.75 to 10.00
No. 1 foundry cast.....	10.75 to 11.00
No. 2 foundry cast.....	9.75 to 10.00
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district.....	6.50 to 6.75
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.....	13.00 to 13.25
No. 1 railroad malleable stock.....	11.25 to 11.50
Grate bars.....	7.50 to 7.75
Low phosphorus melting stock.....	14.00 to 14.25
Iron car axles.....	24.25 to 24.75
Steel car axles.....	17.25 to 17.50
Locomotive axles, steel.....	20.75 to 21.25
Locomotive axles, iron.....	25.25 to 25.75
No. 1 busheling scrap.....	10.25 to 10.50
No. 2 busheling scrap.....	6.25 to 6.75
*Machine shop turnings.....	6.75 to 7.00
Old car wheels.....	11.50 to 11.75
*Cast-iron borings.....	7.50 to 7.75
†Sheet bar crop ends.....	13.50 to 13.75
Old iron rails.....	14.25 to 14.50
No. 1 railroad wrought scrap.....	13.50 to 13.75
Heavy steel axle turnings.....	8.75 to 9.00
Stove plate.....	7.50 to 7.75

*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.
†Shipping point.

Coke.—The leading Youngstown consumer has closed with a prominent Connellsville coke operator for about 30,000 tons of furnace coke per month over all this year at the reported price of \$2 per net ton at oven. The same interest has also closed for 15,000 tons of Alicia coke per month over the same period. Some grades of furnace coke that are regarded as standard can be bought at \$1.85 to \$1.90 per net ton at oven, and several large contracts based on these prices have been closed. It is stated that several of the constituent interests of the Producers Coke Company are growing dissatisfied with the present situation, and are inclined to name a lower price than \$2 for their coke, but this is not confirmed. We continue to quote strictly high grade blast-furnace coke for first half delivery at \$2 per net ton at oven, but some standard grades are being offered at \$1.85 to \$1.90. There is a fair demand for foundry coke, which we quote at \$2.50 to \$2.75 per net ton at oven. The output of coke in the Upper and Lower Connells-

ville regions last week is given by the Connellsville Courier as 236,085 net tons, a decrease over the previous week of 48,879 tons.

Chicago

CHICAGO, ILL., January 7, 1914.—(By Telegraph.)

Although planted in what still appears to be somewhat barren soil, the seeds of optimism are sprouting vigorously. Interest in pig iron is decidedly active, perhaps to as great a degree as ever prevailed in this market, with the qualification that tonnages being negotiated represent requirements conservatively estimated. A return of the railroad purchasing departments to their normal function of buying also appears to have been inaugurated, though with a manner not too interested. Rails and steel cars involving at least 200,000 tons of steel are close to the point of being placed in the West. Agricultural implement specifications are more liberal, following the turn of the year, but no promise is held out for the continuance of this activity. The number of buyers asking for terms for contracts covering their needs in plates, shapes, bars and sheets is increasing. Consumers are seeking to secure themselves for the full half at present quotations, a campaign which is being generally resisted by the mills. The booking of mill business is as a result suffering temporarily and the jobbers are enjoying an active store business in supplying immediate needs. The local scrap market is witnessing a not unfamiliar advance in prices, supported by dealers' transactions but not yet applicable to consumers' buying, of which there is very little.

Pig Iron.—The rank and file of melters in this territory are now buying for their first quarter and first half requirements. The great majority of transactions concern tonnages from 2000 down, although some of the larger buyers, such as the American Radiator Company, Crane Company and others, are canvassing the market. Activity at Chicago and to the west and north concerns Northern iron almost entirely, for with local iron selling as low as \$14, f.o.b. furnace for No. 2, the competition of Southern iron, even at as low a price as \$10.50, Birmingham, may be met on an even basis as far as the Fox and Rock River valleys. In and around Chicago the advantage in favor of Northern iron at the going prices is even more pronounced. The field of activity of one Northern interest which competes frequently on the basis of Birmingham prices is especially wide under present conditions. Sufficient iron has already been sold to make the outlook for the first half decidedly brighter from the furnace standpoint. Quotations for Southern iron range from \$10.50, Birmingham, for prompt shipment to \$11 for forward delivery. In view of the various market circumstances, the resistance to decline on the part of Southern iron is noteworthy. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal, Nos. 1, 2, 3, 4.	\$15.25 to \$15.75
Northern coke foundry, No. 1.	14.50 to 15.00
Northern coke foundry, No. 2.	14.00 to 14.50
Northern coke foundry, No. 3.	13.50 to 14.00
Southern coke, No. 1 foundry and No. 1 soft.	15.35 to 15.85
Southern coke, No. 2 foundry and No. 2 soft.	14.85 to 15.35
Southern coke, No. 3.	14.35 to 14.85
Southern coke, No. 4.	13.85 to 14.35
Southern gray forge.	13.85 to 14.35
Southern mottled.	13.35 to 13.85
Malleable Bessemer.	14.00 to 14.50
Standard Bessemer.	17.65
Basic.	13.50 to 14.00
Jackson Co. and Kentucky silvery, 6 per cent.	18.40
Jackson Co. and Kentucky silvery, 8 per cent.	19.40
Jackson Co. and Kentucky silvery, 10 per cent.	20.40

Sheets.—While the resumption of operations by the Gary plant of the American Sheet & Tinplate Company may be taken to indicate a larger volume of business, this is hardly accurate. Accumulated tonnage and orders which owe their placing to the irregularities in quotations are more responsible. Sheet tonnage for prompt shipment is perhaps lighter than otherwise. We quote for Chicago delivery from mill: No. 10 blue

annealed, 1.68c. to 1.73c.; No. 28 black, 2.03c. to 2.08c.; No. 28 galvanized, 3.03c. to 3.08c.

For sheets out of store we quote for Chicago delivery as follows, minimum prices applying on bundles of 25 or more: No. 10 blue annealed, 1.95c.; No. 28 black, 2.45c. to 2.55c.; No. 28 galvanized, 3.50c. to 3.60c.

(By Mail)

Rails and Track Supplies.—The sentimental uplift apparent in market circles has its most tangible support in the activity of the railroads. To the mills who are negotiating, the purchase of rails by the Atchison, Topeka & Santa Fé, the Southern Pacific and the New York Central systems seems virtually a fact. Orders for spikes and bolts are in increased volume, and an inquiry for approximately 10,000 tons of tie plates is noted. Light rail demand is also good. We quote standard railroad spikes at 1.50c. to 1.60c., base; track bolts with square nuts, 2.05c. to 2.10c., base, all in carload lots, Chicago; tie plates, \$27 to \$28 net ton; standard section Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—Inquiry for structural material and, to a lesser extent, orders have improved in volume from the low ebb in December. The placing of business is being held back for the reason that buyers are seeking to use their requirements during the first quarter as a lever in the negotiations for full first half contracts. The mills continue, however, much averse to contracts over a longer period than the first three months. The prices now available for new cars are expected to encourage brisk buying in this direction. The Chicago Elevated Railways placed its order for 128 steel cars December 29 and the Union Pacific negotiations for 5000 steel cars, likely to be closed with Western car builders within a few days, involve the buying of 60,000 to 70,000 tons of steel. Lettings of fabricated steel reported last week were light and included 365 tons for a coal-handling bridge for the Northern Coal & Dock Company, Milwaukee; 365 tons for the Duluth & Iron Range Railroad, to be furnished by the American Bridge Company; 181 tons for Cook's Theater, Duluth, placed with the Lakeside Bridge & Steel Company, and 196 tons for the Metropolitan Life Insurance Building, San Francisco, to be fabricated by the Ralston Iron Works. In Chicago, Lyon & Healy have secured the property at Wabash avenue and Jackson street, upon which a 10-story steel skeleton building will be erected as soon as possible. Prices for plain shapes from mill are unchanged with but few concessions from the general market level of 1.38c., Chicago.

We quote for plates out of jobbers' stocks 1.75c.

Plates.—General inquiry from plate users is reported, but it is largely inquiry concerning contracts and has not yet shown itself fruitful in orders. Firmness has been added to the market to some extent by an acceptance of prevailing quotations as the low point, but this is less true of plates than structural shapes, and for very desirable specifications the quotation of 1.15c., Pittsburgh, has not disappeared. The average carload buyer, however, is paying 1.20c., Pittsburgh. We quote for mill shipment, Chicago delivery, 1.33c. to 1.38c.

While the mills and their customers are failing to agree on the basis for contracts, jobbers' stocks are reaping the miscellaneous orders placed to cover immediate requirements. This is at least a partial explanation for a fairly active demand for plates out of store. We quote for Chicago delivery, from stock, 1.75c.

Bars.—Makers of steel bars are noting with satisfaction the very acceptable specifications being received from the agricultural implement manufacturers. A number of orders for 500 to 1000 tons are reported. Quotations appear to be firm at 1.15c., Pittsburgh. A fair business was also secured last week in bar iron, but this is of course purely relative. The Inland mill of the Republic Iron & Steel Company continues to run to full capacity, but the other East Chicago mill was down the greater part of the week. The hard steel bar situation shows little or no improvement. We quote for mill shipment as follows: Bar

iron, 1.10c. to 1.15c.; soft steel bars, 1.33c.; hard steel bars, 1.35c. to 1.40c.; shafting in carloads, 65 per cent. off; less than carloads, 60 per cent. off.

We quote above prices for Chicago delivery: Soft steel bars, 1.65c.; bar iron, 1.65c.; reinforcing bars, 1.65c. base, with 5c. extra for twisting in sizes $\frac{1}{2}$ in. and over, and usual card extras for smaller sizes; shafting 57 per cent. off.

Rivets and Bolts.—In no other direction is the present situation more quiet than with respect to nuts, bolts and rivets. The new quarter promises to bring out a somewhat freer specifying by the implement and wagon manufacturers, but definite improvement is not in sight. We quote from mill as follows: Carriage bolts up to $\frac{3}{4}$ x 6 in., rolled thread, 80-7 $\frac{1}{2}$; cut thread, 80; larger sizes, 75; machine bolts up to $\frac{3}{4}$ x 4 in., rolled thread, 80-12 $\frac{1}{2}$; cut thread, 80-7 $\frac{1}{2}$; large size, 75-7 $\frac{1}{2}$; coach screws, 80-15-10; hot pressed nuts, square head, \$6 off per cwt.; hexagon, \$6.70 off per cwt. Structural rivets, $\frac{1}{2}$ to 1 $\frac{1}{4}$ in., 1.88c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

Out of store we quote for structural rivets, 2.40c., and for boiler rivets, 2.60c. Machine bolts up to $\frac{3}{4}$ x 4 in., 70-10-10; larger sizes, 70-12 $\frac{1}{2}$; carriage bolts up to $\frac{3}{4}$ x 6 in., 75-10; larger sizes, 70-12 $\frac{1}{2}$ off. Hot pressed nuts, square head, \$5.50, and hexagon, \$6.20 off per cwt.

Old Materials.—In failing to show an advance in the price of scrap the past week in this market, our quotations below do not take cognizance of current asking prices, which are undoubtedly higher. Trades between dealers and brokers during the week have been on a basis from 25c. to 50c. per ton higher for almost all grades of material than consumers have been willing to pay. In consequence there has been little or no buying for consumption except where small lots of scrap, on track, or requiring to be moved promptly for other reason, were available at the lower prices. Delivered prices such as are quoted here are, therefore, practically unchanged although consumers, should they find it necessary to come into the market, would doubtless be compelled to meet the advance. The most important railroad list for which quotations are being asked is that of the Chicago & Northwestern, for 7500 tons, including 2500 tons of steel rails and 500 tons of No. 1 wrought. The Chicago & Alton is selling 600 tons; the Wabash, 900 tons; the Chicago & Eastern Illinois, 400 tons, and the New York Central Lines, 1000 tons. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Old iron rails	\$13.00 to \$13.50
Old steel rails, rerolling	11.00 to 11.50
Old steel rails, less than 3 ft.	10.25 to 10.75
Relaying rails, standard section, subject to inspection	24.00
Old carwheels	11.50 to 12.00
Heavy melting steel scrap	9.00 to 9.50
Frogs, switches and guards, cut apart	9.00 to 9.50
Shoveling steel	8.00 to 8.50
Steel axle turnings	6.50 to 7.00

Per Net Ton	
Iron angles and splice bars	\$11.75 to \$12.25
Iron arch bars and transoms	11.75 to 12.25
Steel angle bars	8.00 to 8.50
Iron car axles	17.00 to 17.50
Steel car axles	12.00 to 12.50
No. 1 railroad wrought	8.50 to 8.75
No. 2 railroad wrought	7.75 to 8.00
Cut forge	7.75 to 8.00
Steel knuckles and couplers	8.75 to 9.25
Steel springs	9.25 to 9.75
Locomotive tires, smooth	10.25 to 10.75
Machine shop turnings	4.00 to 4.25
Cast borings	3.75 to 4.00
No. 1 busheling	7.25 to 7.50
No. 2 busheling	5.75 to 6.00
No. 1 boilers, cut to sheets and rings	5.75 to 6.00
Boiler punchings	9.50 to 10.00
No. 1 cast scrap	10.00 to 10.25
Stove plate and light cast scrap	9.25 to 9.75
Grate bars	8.25 to 8.75
Railroad malleable	9.00 to 9.25
Agricultural malleable	8.00 to 8.50
Pipes and flues	6.50 to 7.00

Wire Products.—Active canvassing of the trade which consumes the various wire products is resumed this week, following the holidays. Mail orders have been fair. For prompt shipment, quotations equivalent to \$1.50, Pittsburgh, for nails are still being made, but contracts even at prices \$1 a ton higher are not considered especially desirable from the mill standpoint. We quote to jobbers as follows: Plain wire, No. 9 and coarser, base, \$1.53; wire nails, \$1.68

to \$1.73; painted barb wire, \$1.68 to \$1.73; galvanized, \$2.05 to \$2.10; polished staples, \$1.68 to \$1.73; galvanized, \$2.05 to \$2.10, all Chicago.

Cast-Iron Pipe.—The United States Cast Iron Pipe & Foundry Company is the low bidder for the 12,000 tons of pipe for Chicago for which prices were received January 3. This company will also furnish the pipe required by the Peoples' Gas Light & Coke Company, Chicago, during the year, a tonnage approximating 8000. Inquiry for pipe for municipal installation is much better. We quote as follows, per net ton, Chicago: Water pipe, 4 in., \$27; 6 to 12 in., \$25; 16 in. and up, \$24, with \$1 extra for gas pipe.

Philadelphia

PHILADELPHIA, PA., January 6, 1914.

A more cheerful atmosphere surrounds the market and in a number of lines price recessions appear checked. Consumers are showing more interest in covering for requirements over extended periods but they find sellers less disposed to enter such contracts at current prices. While pig-iron orders have shown an increase the past month, stocks on furnace yards have also generally shown an increase, but they are still of insignificant proportions. Competition continues to develop irregularities in pig-iron prices. Outside of heavy plates, business in finished materials has changed but little. Furnace coke shows further strength. Old materials remain comparatively quiet. English ferromanganese has been reduced to \$45, seaboard.

Iron Ore.—Offerings are extremely light, consumers showing no interest in the market. Importations in the week ended January 3 included 7126 tons from Sweden, 6450 tons from Cuba, 11,900 tons from Newfoundland and 100 tons from Spain.

Pig Iron.—Consumers are making inquiries more freely and show a willingness to contract for at least the first half of the year, but makers are not satisfied to load up order books at these prices. They have, however, been entering considerable business for delivery the first quarter. While the bulk of the sales has been small, more business in lots running up to 500 tons has been moving. Prices of eastern Pennsylvania standard brands have narrowed down closely to \$15 delivered for No. 2 X foundry. While some furnaces hold for slightly higher figures, others meet Buffalo and central Pennsylvania competition. Buffalo No. 2 X has been sold in this district at \$14.95 delivered, while some brands of central Pennsylvania No. 2 X have been sold at \$14.85 here. Most of this business has been for early delivery, but it is understood that some of the orders have covered the first quarter. Cast-iron pipe makers have been more active purchasers. One interest, recently in the market for 5000 tons, has bought some 4000 tons, dividing the business between several sellers, taking forge and low-grade foundry at prices ranging from \$14 to \$14.25 delivered. The leading interest is reported in the market for tonnage, and has purchased odd lots at \$14, delivered. Soil-pipe makers are reported purchasers of moderate lots, while a sanitary ware manufacturer is in the market for 1000 tons, mixed grades. Virginia foundry is reported weak; small sales for early delivery have been made at \$12.75 at furnace for No. 2 X, but it is reported that this price has been shaded. A local buyer has taken 400 tons of malleable pig for January delivery. Rolling mill forge has been in better demand; a sale of 1800 tons has been made to a consumer up the State and inquiries for moderate lots are pending. There is little demand for basic in this district. A block of 4000 tons of Lebanon low phosphorus iron has been sold at \$17.50 at furnace, for delivery over the first half. Standard analysis low phosphorus is being held at \$21 to \$21.25 delivered here, while foreign low phosphorus is held at \$20.50 for near seaboard delivery. While some business is before the trade in these grades, sales have been light. Quotations for standard brands of iron have a shade firmer appearance, as present selling prices are in most cases below the cost line. For delivery in buyers' yards in this district, the

following range is named for prompt or first quarter shipment:

Eastern Pennsylvania No. 2 X fdry.	\$14.85 to \$15.00
Eastern Pennsylvania No. 2 plain	14.80 to 14.75
Virginia No. 2 X foundry	15.55 to 16.00
Virginia No. 2 plain	15.30 to 15.50
Gray forge	14.00 to 14.25
Basic	14.00 to 14.25
Standard low phosphorus	21.00 to 21.25

Ferroalloys.—The announcement to-day of a reduction of \$2 a ton for English 80 per cent. ferromanganese to \$45 at seaboard resulted in the closing of several small pending orders. No large inquiry is before the trade in this district. Information as to sellers of domestic or German ferromanganese meeting the new English quotation is not yet available. Ferrosilicon, notwithstanding recent price reductions, has been quiet.

Billets.—While producers continue to receive a number of inquiries for first quarter and half deliveries, buyers and sellers are still deadlocked on prices. Makers are holding out for \$22.40 delivered here for basic open-hearth rolling billets, but would accept \$21.50 on a desirable quantity with satisfactory specification. The leading producer in this district has not yet resumed operations following the holiday shut down on November 20. Forging steel, which has been in moderate demand, but without important sales, commands an advance of about \$4 a ton over rolling billets, on ordinary specification steel.

Plates.—A very good general demand, together with moderate first quarter contracting, is reported. Consumers endeavor to place extended contracts, but mills are restricting acceptances to first quarter. One Eastern maker operated at a 60 per cent basis last week and feels particularly cheerful as to the situation, expecting continued betterment. Prices are a trifle firmer, current business being taken by Eastern mills at 1.40c. delivered. Small contracts are entered on the same basis, but on strongly competitive business 1.35c. delivered has been done. While most of the recent orders have been small, some contracts running up to 1000 tons have been entered.

Structural Material.—Business has been comparatively light, although several sizable propositions are before the trade. Actual transactions in this district have been confined to small lots. In Baltimore a new warehouse for the Baltimore Bargain House, some 4000 tons, is being figured on. Competition is keen on all classes of business, but prices appear to be more firmly held at 1.35c. to 1.40c., for plain shapes, delivered in this vicinity.

Sheets.—Price irregularities continue, mills usually making concessions from recent quotations for desirable orders. Most sales are small lots for prompt delivery. Sheet mills in this district resumed partial operations last week, mostly on hold-over orders. Sufficient business to enable regular operation has not yet developed. Prices are easier, No. 10 blue annealed sheets being quoted at 1.55c. to 1.60c. delivered here.

Bars.—A moderate volume of buying in steel bars is moving at 1.35c. to 1.40c. here, according to quantity and specification. Competition for business offered in common iron bars is sharp and on desirable specifications 1.20c. delivered here has been more freely reported. Some mills hold firmly at 1.22½c. to 1.27½c. delivered. Mill operations continue irregular.

Coke.—Fair sales of first quarter furnace coke have been made at \$2 at oven, and consumers find it difficult to obtain standard brands under that. Offerings of prompt coke have been lighter, although some brands are available at \$1.85 to \$1.90 at oven. A moderate movement of foundry coke at unchanged prices is noted. The following range of prices is named, per net ton, for deliveries in buyers' yards in this district:

Connellsville furnace coke	\$3.90 to \$4.40
Connellsville foundry coke	4.90 to 5.25
Mountain furnace coke	3.60 to 4.10
Mountain foundry coke	4.60 to 4.95

Old Material.—Steel makers have made further purchases of No. 1 heavy melting steel scrap at \$10 delivered, one consumer's purchases totaling 5000 tons. Dealers frequently pay up to \$10.25 delivered for this grade, applying purchases against old higher price

contracts. Railroad offerings of old material this month are reported lighter than usual and are expected to command better than minimum quoted prices. Railroad wrought has been sold in moderate lots at \$12.50 and \$12.75. Consumers of rolling mill scrap, while showing more interest in the market, have not been extensive buyers. The following quotations about represent figures at which business could be done, delivered in buyers' yards in this district, covering eastern Pennsylvania and taking freight rate varying from 35c. to \$1.35 per gross ton:

No. 1 heavy melting steel	\$10.00 to \$10.25
Old steel rails, rerolling (nominal)	12.25 to 12.50
Low phosphorus heavy melting steel	
scrap (nominal)	14.00 to 14.50
Old steel axles (nominal)	15.50 to 16.00
Old iron axles (nominal)	21.00
Old iron rails (nominal)	13.50
Old carwheels	12.00 to 12.50
No. 1 railroad wrought	12.75 to 13.00
Wrought-iron pipe	9.00 to 9.25
No. 1 forge fire	7.75 to 8.25
No. 2 light iron (nominal)	5.00
No. 2 busheling (nominal)	7.50 to 8.00
Wrought turnings	6.75 to 7.00
Cast borings	7.50 to 7.75
Machinery cast	12.00 to 12.50
Grate bars, railroad	9.00 to 9.50
Stove plate	9.00 to 9.50
Railroad malleable (nominal)	9.00 to 9.50

Cincinnati

CINCINNATI, OHIO, January 7, 1914.—(By Telegraph.)

Pig Iron.—The extended period of inactivity in this market appears to be near its termination. Users of foundry iron are taking much more interest in the market, the inquiry showing considerable improvement. Actual business transacted in this vicinity is not up to the volume reported from other centers, but so many melters have not yet covered for first half requirements that there is no telling when a buying movement may be inaugurated. As a rule, buyers have been loath to anticipate the future, preferring to purchase only to fill nearby needs. Among the general inquiries are two from local melters for 500 and 1500 tons respectively, with both Northern and Southern brands specified. A northern Ohio firm is asking for 2000 tons of No. 2 Southern and a Michigan manufacturer is expected to close soon for the same tonnage of foundry iron that will probably be furnished by Lake furnaces. Several Indiana melters are sounding the market with inquiries ranging from 100 to 1000 tons, all for first half. One of the large basic consumers in this territory has bought a comparatively limited tonnage for nearby delivery. Northern No. 2 foundry is quoted firm at \$13, Ironton, for any shipment during the first half. Southern iron is considerably firmer, and it would be difficult to purchase standard brands for prompt shipment at anything below \$11, Birmingham; in fact, the lowest available Southern furnace quotation this week is \$10.75, Birmingham basis, although small lots of speculative iron might be bought 25c. a ton lower. Malleable continues very dull. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry and 1 soft	\$14.50 to \$15.00
Southern coke, No. 2 foundry and 2 soft	14.00 to 14.50
Southern coke, No. 3 foundry	13.50 to 14.00
Southern, No. 4 foundry	13.00 to 13.50
Southern gray forge	12.50 to 13.00
Ohio silvery, 8 per cent. silicon	17.70 to 18.20
Southern Ohio coke, No. 1	15.20 to 15.70
Southern Ohio coke, No. 2	14.20 to 14.70
Southern Ohio coke, No. 3	13.95 to 14.20
Southern Ohio malleable Bessemer	14.20 to 14.70
Basic, Northern	14.20 to 14.70
Lake Superior charcoal	16.25 to 17.25
Standard Southern carwheel	27.25 to 27.75

(By Mail)

Coke.—Comparatively heavy contracting for furnace coke by furnaces in the southern Ohio district has had a tendency to stiffen the market. Leading Connellsville 48-hr. brands are not obtainable below \$2 per net ton at oven, although a few small lots of inferior grades could be picked up, for prompt shipment, around \$1.90. Wise County and Pocahontas operators are even firmer, and from \$2 to \$2.20 is quoted on fur-

nace coke for either prompt or first half. It is too early after the holiday season to bring out any improvement in the demand for foundry coke, although many consumers are now more disposed to contract for their future requirements, but prices are stronger and \$2.50 is said to be minimum on prompt, with a few Connellsville interests holding for \$2.75 per net ton at oven. Wise County foundry is quoted around \$3 and Pocahontas \$2.90 to \$3.

Finished Material.—The market is a trifle firmer on sheets, especially galvanized. The advance in the price of spelter of approximately \$5 a ton will doubtless tend to further strengthen prices. We quote No. 28 black sheets at 2c. to 2.05c. and galvanized 3.05c., f.o.b. cars, Newport, Ky., or Cincinnati. No. 10 blue annealed sheets are quoted from warehouse stocks at 2.10c. to 2.15c. There is no improvement in the demand for either steel bars or structural shapes, and quotations are unchanged at 1.75c. for the former and 1.85c. for the latter, f.o.b. local warehouses. Railroad track material is very quiet.

Old Material.—The first few days of the present year have brought little change in the situation. There is scarcely any buying and prices are about as near the bottom as it seems possible for them to get. The minimum figures given below represent what buyers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations are dealers' prices, f.o.b. yards:

Per Gross Ton		
Bundled sheet scrap	\$6.00 to	\$6.50
Old iron rails	10.50 to	11.50
Relaying rails, 50 lb. and up.	19.25 to	19.75
Revolving steel rails	10.50 to	11.00
Melting steel rails	8.75 to	9.25
Old carwheels	9.75 to	10.25
Per Net Ton		
No. 1 railroad wrought	\$8.00 to	\$8.50
Cast borings	4.00 to	4.50
Steel turnings	4.00 to	4.50
No. 1 cast scrap	8.25 to	8.75
Burnt scrap	5.50 to	6.00
Old iron axles	15.50 to	16.00
Locomotive tires (smooth inside)	9.25 to	9.75
Pipes and flues	5.25 to	5.75
Malleable and steel scrap	6.25 to	6.75
Railroad tank and sheet scrap	4.00 to	4.50

Cleveland

CLEVELAND, OHIO, January 6, 1914.

Iron Ore.—Practically no ore has been shipped from the docks since the close of navigation, and this is causing some anxiety among ore firms, as there is danger that adequate dock space will not be available at the opening of navigation. Everything points to a very late buying movement. We quote 1913 prices as follows: Old range Bessemer, \$4.40; Mesaba Bessemer, \$4.15; old range non-Bessemer, \$3.50; Mesaba non-Bessemer, \$3.40.

Pig Iron.—A fair volume of activity has developed. Considerable inquiry has come out for first half, mostly in foundry and basic grades. One local producer reports the sale of about 10,000 tons in the past two days, including 3000 tons of basic for the first quarter. The remainder was in foundry iron and included a 2400-ton lot for first-half delivery. Foundry iron is quoted at \$12.75 to \$13, Cleveland, for No. 2, and a number of first-half sales have been made at the latter price. The same quotations are being made in the Valley. Some Tennessee resale iron is being offered at \$10.75, or possibly \$10.50, for early shipment, but Alabama furnaces appear to be holding firmly to \$11. The Andrews Steel Company, Newport, Ky., is reported to have bought 18,000 to 20,000 tons of Southern basic for the first half at \$10.50, Birmingham, or \$13.75 delivered. It is understood that on this inquiry one Valley interest and one Cleveland producer made a quotation of \$12.25, or \$13.80 delivered. A sale of 2000 tons of malleable iron in Indianapolis is reported divided between a Cleveland and another Ohio furnace, the former taking part at \$12.25 and the other at \$12.50. Among inquiries pending is one from the Lima Locomotive Corporation for 2000 tons of Northern or Southern foundry and one from Mansfield, Ohio, both

for the first half. One of the stacks of the Cleveland Furnace Company will be blown out next week. Cherry Valley furnace of the M. A. Hanna Company, at Leetonia, Ohio, was blown in December 30, this furnace having been out for relining. Corrigan, McKinney & Co. have not yet blown out any of their furnaces, but claim they have not changed their determination to do so, because of the high price of coke. They state that their Cleveland furnaces will be blown out within a week and their Josephine and Scottdale stacks later in the month. We quote delivered Cleveland as follows:

Bessemer	\$15.15
Basic	13.00
Northern No. 2 foundry	\$13.25 to 13.50
Southern No. 2 foundry	15.10 to 15.35
Jackson County silvery, 8 per cent. silicon	18.55

Coke.—One Cleveland interest has bought about 10,000 tons of standard furnace coke for prompt shipment at \$1.95 and another reports the purchase of 15,000 tons of Connellsville furnace coke at \$1.75 for January shipment. Most producers are adhering to \$2 for six months contracts, but standard brands can be had at \$1.95 for the first quarter. Foundry coke is quiet with prices unchanged at \$2.50 to \$2.75 per net ton. Owing to the slackening of foundry operations shipments of coke have been held up.

Finished Iron and Steel.—Sentiment is much better and demand shows considerable improvement both in the desire of consumers to place contracts and in inquiries accompanied by specifications for material for early delivery. The downward price tendency apparently has been stopped. Current prices are 1.20c., Pittsburgh, for steel bars, plates and structural material and some mills are getting 1.25c. for small lots. Buyers appear to have given up efforts to break the 1.20c. price on steel bars. The only shading is on plates. While the large mills are adhering to the regular quotation, some business is still being taken by smaller mills at 1.15c. Contracts are being taken at 1.25c. for steel bars, plates and structural material for the first quarter and 1.30c. for the first half, buyers being allowed to specify current orders on these contracts at the going prices. One order has been placed for 1500 tons of plates and another inquiry is pending for 3000 tons for tank work. New inquiries have come out for about 3500 tons of structural material, largely for bridge work. The contract for 1000 tons of shapes and 2500 tons of reinforcing bars for the Superior avenue bridge, Cleveland, will probably be placed this week. Demand for iron bars is inactive and prices are irregular, the price ranging from 1.15c. to 1.25c., Cleveland. Sheets have stiffened up. While quotations of 1.85c. for No. 28 black and 2.85c. for No. 28 galvanized are still being made, some of the mills will not make contracts under 1.90c. and 3c. Warehouse business during December showed considerable improvement over November. Stock prices are unchanged at 1.80c. for steel bars and 1.90c. for plates and structural.

Old Material.—There is practically no demand for scrap for prompt shipment and most mills have covered requirements for some time ahead, so that much early activity is not looked for. One Youngstown mill is in the market for heavy steel scrap for March and April delivery at \$10.75 to \$11, delivered. A Cleveland consumer is taking some heavy steel scrap at \$9.50 to \$9.75. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton		
Old steel rails, rerolling	\$12.00 to	\$12.50
Old iron rails	12.50 to	13.00
Steel car axles	16.50 to	17.00
Heavy melting steel	9.50 to	9.75
Old carwheels	11.50 to	12.00
Relaying rails, 50 lb. and over	23.00 to	25.00
Agricultural malleable	9.00 to	9.50
Railroad malleable	9.75 to	10.00
Light bundled sheet scrap	6.50 to	7.00
Bundled tin scrap	11.00 to	11.50

Per Net Ton		
Iron car axles	\$18.00 to	\$19.00
Cast borings	5.50 to	5.75
Iron and steel turnings and drillings	4.50 to	4.75
Steel axle turnings	5.75 to	6.00
No. 1 busheling	7.75 to	8.00
No. 1 railroad wrought	9.50 to	10.00
No. 1 cast	10.50 to	11.00
Stove plate	8.00 to	8.50

Mechanical and Civil Engineers,
PITTSBURGH, PA.

German Tube Combination Formed

Coal and Pig-Iron Syndicates Reduce Their Drawbacks on Export Material

BERLIN, December 18, 1913.

The most interesting news of the week is that the organization of the tube manufacturers has been assured. Only three days ago it looked as if negotiations had reached a deadlock. The western producers, who had already effected an agreement among themselves, finally presented an ultimatum to the Silesian makers. At the very last hour, when the breakdown of the negotiations seemed imminent, the Silesians gave way. It only remains now to work out matters of detail. As this will require some time, the new organization cannot begin its official existence before January 15. It is to run for 10 years. The old syndicates in gas and boiler pipe were dissolved June 30, 1910, since which time there has been an open market, with very reckless price-cutting.

The decision of the coal syndicate to reduce its drawback on coal used to produce iron and steel for export has been followed by similar action on the part of the Pig-Iron Syndicate. After January 1 it will give a drawback of only 4.75 marks (\$1.13), or 1.50 marks (36c.) less than is paid now. In a communication given to the press by the Syndicate, which held a meeting at Essen today, it defends itself against the complaints of the trade that pig iron has not been sufficiently reduced in view of the unsatisfactory state of business. The main point of its argument is that it kept prices relatively low during the great boom in the trade, when its prices for a long time were fully 20 marks (\$4.76) lower than in other countries; hence there is less occasion for making much reduction now. On the other hand, a communication, apparently written by the owner of an iron foundry, has this week appeared in a Cologne newspaper demanding the abolition of the pig-iron duty on the ground that home producers are holding prices too high. The writer cites the case of the Gelsenkirchener Company and its large order, recently reported in this correspondence, for cast-iron pipe for Argentina; he says that the company admits that it estimated the cost of producing its pig iron for filling this order at only 40 marks (\$9.52) and still had a fair profit.

The Syndicate admits that consumers have been holding back orders for the first half of 1914, but says that buying has become more active within a few days, which it attributes to the firmer appearance of the English market. The foreign demand, it adds, has grown substantially stronger and extends in part to deliveries for distant dates, showing that existing prices are regarded as low and involving no risk.

In semi-finished steel the market position is practically unchanged, though buying for the first quarter of 1914 is becoming more active. Manufacturing consumers are complaining of sharp foreign competition in finished products, and evidently think that the drawback allowed by the Steel Works Union is insufficient. In beams and other structural shapes the works are deeply dissatisfied with the volume of orders; shipments are less than half of the allotments. Work on heavy rails continues satisfactory, but a quieter tone is reported in export business.

December 25, 1913.

The de Wendels, Hayingen, have this week advanced steel bars 2 marks (48c.) to 97 marks (\$23.08), and it is stated that the other mills of the Lorraine-Luxemburg district are following its prices. The makers of horseshoe nails have agreed upon a price convention, and prices are to be raised about 20 per cent.

The organization of the tube syndicate has created a more confident feeling in the general trade. Encouraged by this event, the rod manufacturers have decided to hold a meeting in January to begin negotiations for the prolongation of their organization beyond June 30, 1914, to which time it was provisionally extended some weeks ago. The old difficulty of inducing the wire manufacturers to join the organiza-

tion will again be the chief obstacle to the prolongation; and a number of the rod producers have again declared their unwillingness to continue the organization unless the wire mills are taken in. The market in wire nails is in a very unsatisfactory position; some of the makers, who also make other products, are selling nails at 12 marks (\$2.85) per metric cwt., a price which spells ruin for pure nail mills.

Bars are quieter, because of the holiday season, but some supplementary buying for the March quarter is still reported—such orders being often at as high a price as 100 marks (\$23.80). Heavy and light plates have been more active. Heavy plates command 102 to 105 marks (\$24.28 to \$24.99) for home consumption and 98 to 100 marks (\$23.32 to \$23.80) for export. The Silesian plate trade, however, is reported as being in a highly unsatisfactory condition. There is especially a lack of work in boiler and commercial plates, and in sheets the situation has become even worse.

The Belgian market again reports falling prices. Last week bars and heavy plates for export were reduced 1s. (24c.), owing to the quieter demand from England. Today's advices report further drops in pig iron in the home market, foundry falling 2 francs (38c.) and Thomas iron 1 franc (19c.), the former to 62 to 63 francs (\$11.97 to \$12.16) and the latter to 61 to 62 francs (\$11.77 to \$11.97). It is explained that the reductions are caused by accumulating stocks, increasing foreign competition, and a falling off in the buying demand.

Birmingham

BIRMINGHAM, ALA., January 5, 1914.

Pig Iron.—Actual transactions in pig iron have been limited during the holiday season. Still Southern pig iron for consumption in this district continues strong. Several transactions of carload lots, as well as some few 100 to 500-ton lots were booked in the past week, and all at \$11 for No. 2 foundry. All furnace companies seem willing now to make the \$11 figure good for the entire first half. Production continued through December at about the same rate as for November and seems likely to hold at about the same rate during the current month. The figures for the year show the largest production Alabama has ever had. Stocks on furnace have increased somewhat in the past month. It is probable one new stack will go in in February, which it has been reported would not blow in until about May 1. Special analysis iron commands some premium, as is customary, but for the regular grades quotations remain unchanged. We quote for prompt shipment, or for first quarter or first half, the following schedule per ton of 2240 lb., f.o.b. Birmingham district furnaces:

No. 1 foundry and soft.....	\$11.25 to \$11.50
No. 2 foundry and soft.....	10.75 to 11.00
No. 3 foundry	10.25 to 10.75
No. 4 foundry	10.00 to 10.50
Gray forge	9.75 to 10.25
Basic	10.75 to 11.00
Charcoal	23.50 to 24.00

Cast Iron Pipe.—There is a better feeling among pipe makers, although prices are very low. It seems that with municipal bonds free of any income tax, a better demand has developed for such securities for investment purposes. It is argued, therefore, that different cities will now begin to raise money and make many improvements that have been deferred month after month the past year. If such hopes are realized undoubtedly the water pipe manufacturers would enjoy a much better business, with a tendency for prices to rise from the "slough of despond" into which they seem to have fallen recently. While it is not known just what prices buyers could obtain on large purchases, yet nominal quotations are \$22 for 4-in. and \$20 for 6-in. size and larger, per net ton, f.o.b. cars Birmingham district foundries.

Coal and Coke.—A good deal of contracting is being done now in foundry coke. The lower prices on coke from Virginia and West Virginia have been reflected to some degree in this market, as at present ovens in Virginia are able to encroach upon a considerable por-

tion of the Southern and Southwestern territories that have been held for some time by Alabama coke. Some brands have been offered at \$3 at ovens for Alabama coke, while others range up to as high as \$4, Birmingham district ovens. Nothing is being done now in furnace coke, though some 48-hr. coke is moving for special purposes at \$2.50 to \$2.75 at ovens. The coal market is reviving from the influence of the Christmas holiday shut-downs and with the improved demand with the advent of real winter weather.

Old Material.—The New Year brings a better feeling among the scrap iron dealers. Considerable trading has been done the past three or four days. Prices are slightly firmer, but we continue to quote, f.o.b. dealers' yards here, as follows:

Old iron axles (small).....	\$15.00 to \$15.50
Old steel axles (light).....	15.00 to 15.50
Old iron rails.....	12.50 to 13.50
No. 1 railroad wrought.....	12.00 to 12.50
No. 2 railroad wrought.....	10.00 to 10.50
No. 1 country wrought.....	9.50 to 10.00
No. 2 machinery cast.....	10.50 to 11.00
No. 1 steel scrap.....	10.50 to 11.00
Tram carwheels.....	10.50 to 11.00
Standard carwheels.....	12.00 to 12.50
Light cast and stove plates.....	9.00 to 9.50

British Tin Plates for Texas

General British Trade Conditions Quiet—Steel Corporation Sells Sheet Bars to England

(By Cable)

LONDON, ENGLAND, January 7, 1914.

The quarterly meeting of ironmasters to be held at Birmingham Thursday is awaited with special interest. Meantime all markets are quiet. Pig iron is steady. The United States Steel Corporation is now selling semi-finished steel for early shipment and has sold sheet bars at 85s. (\$20.66), c.i.f. Liverpool. The Texas tin-plate order was divided, Wales getting 90,000 boxes. Stocks of pig iron in Connal's stores are 138,924 gross tons, against 138,360 tons last week. We quote as follows:

Tin plates, coke 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 12s. 7½d. (\$3.07).

(The following prices are per ton of 2240 lb.):

Cleveland pig iron warrants (Monday), 50s. 1d. (\$12.18), against 50s. 2d. (\$12.20) one week ago.

No. 3 Cleveland pig iron, makers' price, f.o.b. Middlesbrough, 50s. 6d. (\$12.29), against 50s. 9d. (\$12.35) one week ago.

Hematite pig iron, f.o.b. Tees, 61s. 6d. (\$14.96), against 60s. 6d. (\$14.72) one week ago.

Ferromanganese, £9 5s. (\$45.01).

Steel sheet bars (Welsh), delivered at works in Swansea Valley, £4 10s. (\$21.89), against £4 15s. (\$23.11) one week ago.

Steel bars, export, f.o.b. Clyde, £6 (\$29.20).

Steel joists, 15-in., export, f.o.b. Hull or Grimsby, £5 7s. 6d. (\$26.15), against £5 12s. 6d. (\$27.37) one week ago.

Steel ship plates, Scotch, delivered local yards, £6 17s. 6d. (\$33.46).

Steel black sheets, No. 28, export, f.o.b. Liverpool, £9 (\$43.80).

Steel rails, export, f.o.b. works port, £6 2s. 6d. (\$29.81), against £6 5s. (\$30.41) one week ago.

(The following prices are per export ton of 1015 kilos, equivalent to 2237.669 lb.):

German sheet bars, f.o.b. Antwerp, 82s. 6d. (\$20.07).

German 2-in. billets, f.o.b. Antwerp, 80s. (\$19.46).

German basic steel bars, f.o.b. Antwerp, £4 11s. to £4 12s. (\$22.13 to \$22.37).

German joists, f.o.b. Antwerp, £5 2s. to £5 5s. (\$24.82 to \$25.55), against £5 5s. to £5 8s. (\$25.55 to \$26.28) one week ago.

(By Mail)

Improvement Likely to Be Very Gradual—Continental Competition Still Active

LONDON, December 27, 1913.

Sentiment is gradually—very gradually—improving in the British iron and steel markets, and there is at

least a fair chance of the early part of the new year seeing a moderate turn for the better. For one thing buyers have been out of the market for so long that they will soon be forced to come out of their shells, while at the same time there has been in most producing connections a really marked decrease in the output. The falling off, for instance, in the production of pig iron within the last three or four months must have been very considerable, and it is now highly improbable that the country's outturn for the year will be more than 10,000,000 tons. This is a long way above the 1912 total of 8,889,000 tons, the smallness being due, of course, to the colliers' strike which for months half paralyzed the trade of the country. The restriction of output now in force is bound to be an influence one day. At present the production is fully equal to the consumption, but the latter is on a very poor scale relatively, and some broadening is inevitable shortly. The hematite position has improved distinctly, and makers are not at all anxious sellers even at 1s. to 1s. 6d. advance over the prices lately paid by Sheffield consumers for large tonnages. Taken as a whole, but little buying has been done yet of foundry irons for next year's delivery and the release of orders cannot be deferred much longer. It is the general idea that coke prices will have to come down with the new year, and certainly they appear to be far too high to be justified by the state of trade. A reduction of costs in this direction would be of considerable assistance to the pig iron makers whose complaints are loud as to the onerous terms under which they are compelled to carry on their business.

Continental Steel at Low Prices

In the finished iron trade a slow sort of business is being done, and lower prices continue to come into effect, more especially where export orders are at stake. This trade has been cut up a good deal by the foreigners, especially the Belgians and Germans, who are still on the lookout for orders, though possibly they are a little less aggressive in their attempts to get them. As for steel, the makers of semi-finished speak pretty confidently of the big business which is to be released soon, and there is some talk of prices being stiffer, but really the improvement wants searching for. Admitting that business is not possible at the extreme low points at which orders were taken this year, it is yet possible to buy at the prices which were openly quoted as representing the views of sellers. That is to say, while one or two clever buyers got in around 77s., f.o.b. (\$18.73) for sheet bars, 80s. f.o.b. (\$19.47) or thereabouts was the price which most people paid, and it is at 80s. f.o.b. that business can be done to-day. A few thousand tons of French steel have been sold this week at about this figure.

Finished steel is quiet and the continued influx of German material into the Clyde shipbuilding area is regarded with the utmost annoyance by the local steel makers, who, however, have only themselves to thank for the position in which they find themselves. The Cunard company has placed an order on the Tyne for a new liner for Canadian service, to be named Aurania.

St. Louis

ST. LOUIS, Mo., January 5, 1914.

Pig Iron.—A disposition to contract for the first half developed. One interest reported nearly 10,000 tons of No. 2 and No. 3 Southern closed chiefly in 1000 and 1500-ton lots. Smaller sales included one of 700 and one of 600 tons. Inquiries unfilled at the close of the calendar period included 300 tons of high manganese Southern iron, 400 tons of high silicon, 1000 tons No. 2 Southern, and 1700 tons and 1900 tons of the same grade. The price for No. 2 Southern foundry, Birmingham basis, is quoted still at \$11, but concessions are being made on transactions closely traded for, though the market has not yet reached \$10.50, as is evidenced by the continued presence in the market of old inquiries which could be filled at that figure, but which are not yet closed. Probably \$10.75 represents the extent of the concessions made. Late sales to-day included one

of 3000 tons of No. 3 Southern and 3000 tons Northern foundry iron. Inquiries remaining unfilled at the close of to-day's business aggregated in excess of 10,000 tons, with \$10.75 practically accepted as the No. 2 Southern price.

Coke.—There were no large transactions in the week. Small lots bought continue to show figures above the best obtainable price in competition. By-product coke stands here at the Connellsville basis plus \$2.80, the freight cost. The only inquiry of consequence appearing was one for about 75 cars for first half delivery.

Finished Iron and Steel.—The fabricating shops continue fairly busy and new business keeps cropping up. Track fastenings are in light demand. Plates are very dull. Business is not large enough to occasion sharp trading and therefore there is no particular evidence of weakness in prices.

Old Material.—Dealers are inclined to expect a definite improvement before the end of the month. There is some increase in the demand for old material, especially steel scrap. Relaying rails are very scarce and in demand, especially the heavier weights. Iron scrap is in rather light demand, though some improvement is noted in foundry material. We quote dealers' buying prices f.o.b. St. Louis as follows:

Per Gross Ton	
Old iron rails	\$11.25 to \$11.50
Old steel rails, rerolling	11.00 to 11.50
Old steel rails, less than 3 feet	9.75 to 10.00
Relaying rails, standard section, subject to inspection	23.00 to 24.00
Old carwheels	10.75 to 11.00
No. 1 railroad heavy melting steel scrap	9.75 to 10.00
Shoveling steel	8.25 to 8.75
Frogs, switches and guards cut apart	9.50 to 10.00
Per Net Ton	
Iron angle bars	\$10.25 to \$10.50
Steel angle bars	8.50 to 9.00
Iron car axles	15.75 to 16.25
Steel car axles	11.25 to 11.50
Wrought arch bars and transoms	11.00 to 11.50
No. 1 railroad wrought	8.50 to 9.00
No. 2 railroad wrought	8.00 to 8.50
Railroad springs	8.50 to 9.00
Steel couplers and knuckles	8.50 to 9.00
Locomotive tires, 42 in. and over, smooth	9.50 to 10.00
No. 1 dealers' forge	7.50 to 8.00
Mixed borings	3.25 to 3.50
No. 1 busheling	7.50 to 8.00
No. 1 boilers, cut to sheets and rings	5.50 to 6.00
No. 1 cast scrap	9.50 to 10.00
Stove plate and light cast scrap	7.50 to 8.00
Railroad malleable	8.00 to 8.25
Agricultural malleable	7.25 to 7.50
Pipes and flues	5.25 to 5.50
Railroad sheet and tank scrap	4.50 to 5.00
Railroad grate bars	6.50 to 7.00
Machine shop turnings	4.00 to 4.25
Bundled sheet scrap	5.50 to 6.00

Buffalo

BUFFALO, N. Y., January 6, 1914.

Pig Iron.—Producers have shown a more aggressive spirit in efforts to secure business and users manifest increasing interest in forward needs. As a consequence, total sales for the district amount to nearly 40,000 tons—all grades. A considerable portion was placed at figures slightly under last week's schedules. Producers state that iron cannot now be bought at the price obtainable a week ago. There has been quite a notable increase in inquiry in the past two or three days. Actual consumption by melters is still at a low stage, but indications are that there will soon be a perceptible increase in volume of orders received by foundries. The X furnace of the Wickwire Steel Company has been blown out for repairs, and the company has not decided when it will again be put in blast. As closely as the market can be approximated, we quote the following prices for first quarter and first half delivery f.o.b. furnace:

No. 1 foundry	\$13.00
No. 2 X foundry	\$12.50 to 13.00
No. 2 plain	12.50 to 12.75
No. 3 foundry	12.00 to 12.25
Gray forge	12.00 to 12.25
Malleable	12.50 to 13.00
Basic	13.00 to 13.50
Charcoal	15.50 to 16.50
Charcoal, special brands and analysis	17.00 to 19.50

Furnacemen state that this is the lowest schedule of prices operative in this market for 10 or 15 years,

notwithstanding relatively high prices for ore and coke and high wage scales.

Finished Iron and Steel.—Moderate tonnage orders for prompt shipment are being received in good numbers for bars, angles, tees and other finished materials. Consumers are showing a disposition to make contracts and some are being closed, but only for short-time delivery. Contracts made at present prices are strictly limited by sellers to first quarter delivery and tonnages offered for extended delivery at the same prices are being turned down. Prices for bar material, structural plates and shapes are being firmly held at 1.20c., Pittsburgh, base. More interest on the part of buyers and considerable movement is noted in cold-rolled steel, 63 per cent. discount being the current quotation. In black and galvanized sheets business shows a perceptible increase, with more inquiry and a fair volume of orders. Specifications for tin plate have lately been coming in quite freely and tin plate mills are filling up quite rapidly. In wire products also there is improved demand and a fair amount of specification at current prices which are being firmly held. In fabricated structural lines the situation continues quiet but with a good outlook. The Lackawanna Bridge Company has taken 300 tons for two bridges for the Pennsylvania. The George Kellogg Structural Company, Buffalo, is low bidder for 1000 tons, including Bethlehem shapes, for the Buffalo South Side High School.

Old Material.—The increase in demand noted last week is broadening, particularly for heavy melting steel, cast borings and wrought iron and steel turnings. Prices are beginning to show a slight stiffening tendency, dealers having been able to secure a little higher figures for material they are willing to dispose of. As a rule, dealers are inclined to hold for better prices and this has tended to limit transactions. There has been as yet no quotable change in the price list and we quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel	\$9.75 to \$10.50
Bundled sheet scrap	6.00 to 6.50
No. 1 busheling scrap	8.50 to 9.00
No. 2 busheling scrap	6.00 to 6.50
Low phosphorus steel scrap	15.00 to 15.75
Iron rails	15.00 to 15.50
No. 1 railroad wrought	12.00 to 12.50
No. 1 railroad and machinery cast scrap	12.00 to 12.50
Steel axles	17.00 to 17.50
Iron axles	22.50 to 23.00
Carwheels	10.75 to 11.25
Railroad malleable	10.50 to 11.00
Locomotive grate bars	9.50 to 10.00
Wrought pipe	8.50 to 9.00
Machine shop turnings	5.00 to 5.50
Heavy steel axle turnings	8.00 to 8.75
Clean cast borings	5.50 to 6.00
Stove plate (net ton)	9.75 to 10.00

Boston

BOSTON, MASS., January 6, 1914.

Old Material.—No tangible results from the better feeling in the trade are reported. The producers are as a rule letting go their scrap but in some cases in the Connecticut territory they are holding off for better prices, and so are many of the small dealers. Prices are unchanged. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of \$2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices:

Heavy melting steel	\$7.75 to \$8.00
Low phosphorus steel	13.75 to 14.75
Old steel axles	13.25 to 13.75
Old iron axles	21.25 to 21.75
Mixed shafting	12.25 to 12.50
No. 1 wrought and soft steel	9.00 to 9.25
Skeleton (bundled)	6.00 to 6.50
Wrought iron pipe	6.50 to 7.00
Cotton ties (bundled)	7.00 to 7.25
No. 2 light	3.75 to 4.25
Wrought turnings	4.50 to 5.00
Cast borings	4.50 to 5.00
Machinery, cast	11.25 to 11.50
Malleable	8.00 to 8.25
Stove plate	7.75 to 8.00
Grate bars	6.25 to 6.50
Cast-iron carwheels	11.00 to 11.25

New York

NEW YORK, January 7, 1914.

Pig Iron.—It has been a notably active week in comparison with the first three weeks of December, as well as more active than the last week of 1913. But the increased business has been plainly at the expense of prices, the week bringing out the lowest that have been seen on the present movement. Much of the business was closed quietly, the quotations of furnace companies with which buyers commonly dealt being considered fully as attractive as could be secured in response to general inquiries. One large radiator interest bought for the first and second quarters, the amount being estimated all the way from 20,000 to 40,000 tons. Another radiator company was also in the market and is believed to have bought part of its iron, at least, for the first half. A soil pipe company bought for its three Northern plants, the amount being about 6000 tons, of which a part was No. 3 iron and the remainder No. 2 X. All advices concerning Buffalo transactions indicate the lowest prices in several years, No. 2 X foundry having been sold as low as \$12 at Buffalo furnace, with a range from that figure up to \$13. Some furnaces were unwilling to make their lowest price on business involving shipments into the second quarter. Sales to the general foundry trade in New Jersey and New England have reached a good total in the week. At New Jersey points having a \$1.75 freight from Buffalo the business went to that district very largely, though eastern Pennsylvania furnaces, particularly one interest that has been a low seller, came in for a share of the tonnage placed by foundries at points having the \$2 and \$2.45 rates from Buffalo. There was some increase in stocks in eastern Pennsylvania in December, and one Crane furnace will be blown in this week in the Lehigh Valley. The chief satisfaction sellers take in the business of the past week is that it may lay the foundation for better prices, though there is no present indication of even a beginning of firmness. We quote Northern iron for tidewater delivery as follows: No. 1 foundry, \$14.75 to \$15; No. 2 X, \$14.25 to \$14.75; No. 2 plain, \$14 to \$14.25. Southern iron is quoted at \$15 to \$15.50 for No. 1 and \$14.75 to \$15 for No. 2.

Finished Iron and Steel.—A firm attitude is indicated among makers and some signs are noted of better business through inquiries. Some more cars have come on the market and some further large building projects are being figured in the Metropolitan district. There has been a little increase in inquiries for railroad bridge repair material and the smaller new bridge structures, and more offers have been made by buyers to take material under contracts, though the mills, where a year's business is urged, ask \$1 per ton advance for the second half. One offer to take 250 tons of plates for the first quarter at 1.15c., Pittsburgh, and the same amount for the second quarter at 1.20c., has been turned down by an Eastern mill. New building work in New York which is rapidly taking shape, includes a large structure for the Rogers Peet Company, Fifth avenue, Fortieth to Forty-first street; a building in Long Island City for the American Ever-Ready electrical specialties, and two apartment houses in Brooklyn for Bing & Bing. Bids taken January 5 for the Liberty avenue extension for the New York Municipal Railways, involving 13,500 tons, show that the Phoenix Bridge Company is low at \$707,623. Inquiries for cars not heretofore noted include 1000 gondolas for the Virginian; 200 stock cars for Swift & Co.; 150 refrigerator cars for the Illinois Central; 110 passenger equipment for the Great Northern; 10 passenger equipment for the Lackawanna, and 1000 hopper cars for the Chesapeake & Ohio, in addition to 1000 box and 1000 gondola for the Hocking Valley system already mentioned. The Toledo, St. Louis & Western has entered the market again for 1000 cars. Information came too late to note last week that the Chicago Northwestern Elevated Railroad placed 100 cars with the Cincinnati Car Company. Morris & Co., Chicago, has bought 200 beef cars from the Haskell & Barker Car Company. We

quote mill shipments of steel bars at 1.20c., Pittsburgh, or 1.36c., New York, and plates and plain structural material at 1.20c. to 1.25c., Pittsburgh, or 1.36c. to 1.41c., New York. Iron in grades claimed to be refined are freely quoted at 1.25c., New York, though the bulk of the business appears to be done at 1.30c. to 1.35c., New York. We quote iron and steel bars from store, 1.90c. to 1.95c., and shapes and plates, 1.95c. to 2c.

Cast-Iron Pipe.—The volume of business is expanding rapidly, and manufacturers are highly encouraged with the developments since the opening of the year. The United States Cast Iron Pipe & Foundry Company was low bidder on the Troy and Worcester lettings, and is reported to have also been low bidder on the large quantity of pipe inquired for by the Brooklyn Union Gas Company. The bids received on these lettings are somewhat higher than those at which recent contracts were placed. Large private buyers are coming in now in good number, and with larger orders than a year ago, for spring delivery. Carload lots are quoted at \$22 to \$23 per net ton, tidewater, for 6 in.

Ferroalloys.—A much more optimistic feeling exists in the market than has obtained for some time. This is based on a decided increase in inquiries, especially for forward delivery, together with reports of sales of about 3000 tons of 80 per cent. ferromanganese. Where this tonnage was placed was uncertain though the opinion is expressed that the new domestic producer was the successful contractor. New business of considerable tonnage is also under negotiation. The foreign producers have reduced the price of English ferromanganese \$2 per ton, making it \$45, Baltimore. The large inquiry for 50 per cent. ferro-silicon is still open. Quotations remain at \$73 for carloads; \$72 for 100 tons and \$71 for 600 tons or over.

Old Material.—Dealers are now confident that the market has definitely turned for the better. Sales of steel scrap, rolling mill specialties and cast scrap have been made, and in almost every instance to consumers who but a short time ago manifested no interest in old material. The demand thus far is not broad, but inquiries are decidedly larger. It is expected that the market will show a steady increase in the volume of buying and that normal conditions will prevail in the scrap trade before the year gets much older. At present there is quite an attraction for steel scrap to be diverted to Pittsburgh instead of going to eastern Pennsylvania. Dealers' quotations are as follows, per gross ton, New York:

Old girder and T rails for melting	\$8.00 to \$8.50
Heavy melting steel scrap	8.00 to 8.50
Relaying rails	21.00 to 21.50
Rerolling rails	10.00 to 10.50
Iron car axles	18.50 to 19.50
Steel car axles	12.50 to 13.00
No. 1 railroad wrought	10.25 to 10.75
Wrought-iron track scrap	9.00 to 9.50
No. 1 yard wrought, long	8.50 to 9.00
No. 1 yard wrought, short	7.75 to 8.25
Light iron	3.00 to 3.50
Cast borings	4.75 to 5.00
Wrought turnings	4.75 to 5.00
Wrought pipe	6.75 to 7.25
Carwheels	11.00 to 11.50
No. 1 heavy cast, broken up	10.50 to 11.00
Stove plate	7.50 to 8.00
Locomotive grate bars	6.50 to 7.00
Malleable cast	7.00 to 7.50

Metal Market

NEW YORK, January 7, 1914.

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York	Electro-lytic New York	Tin, New York	Lead		Spelter	
				New York	St. Louis	New York	St. Louis
Dec.	Lake	14.87 1/2	37.00	4.15	4.07 1/2	5.35	5.20
Jan.	2.....	15.12 1/2	14.87 1/2	36.70	4.15	4.07 1/2	5.25
	3.....	15.12 1/2	14.87 1/2	.....	4.15	4.07 1/2	5.25
	5.....	15.12 1/2	14.87 1/2	36.45	4.15	4.05	5.30
	6.....	15.12 1/2	14.87 1/2	36.75	4.15	4.05	5.30
	7.....	15.12 1/2	14.87 1/2	36.60	4.15	4.05	5.30

Copper is quiet at unchanged, but nominal prices. Tin is lower and buying irregular. Lead shows weakness in a dull market. Spelter is off a few points and is dull. Antimony is without change.

New York

Copper.—The spurt in buying which came just before and after Christmas and lasted until almost the last day of 1913 has subsided and the present market is dull and prices are nominal. Lake is quoted at 14.87½c. to 15c., cash, but it is exceedingly hard to obtain; in fact, few sellers have it. Electrolytic is nominally quoted at 14.87½c., cash, but at this figure there is no business. The attitude of consumers appears to be one of waiting for lower prices. The exports of copper in December reached the excellent total of 30,503 tons. The total exports in 1913 showed an increase of 54,695 tons compared with 1912. The exports for 1913 were 382,660 tons. This month 3592 tons have been exported. The quotations in London to-day were £63 17s. 6d. for spot and £64 10s. for futures.

Copper Averages.—The Waterbury average for the month of December was 15c. The average New York price for Lake copper, based on daily quotations in *The Iron Age*, was 14.88c. and for electrolytic, 14.48c.

Tin.—There has been some business here and there, but not a great deal, the recent good buying of futures having eased off. On Monday there was a moderately fair amount of buying of spot. The supply on hand is ample for all requirements and the sales of last week have been mostly below the import cost. The New York quotation to-day is 36.60c. The London quotations are £167 15s. for spot and £169 5s. for futures. Arrivals this month are 670 tons and there is afloat 1745 tons. Deliveries into consumption in December were fair, amounting to 3100 tons. The total deliveries for 1913 showed a decrease of 5600 tons compared with 1912. The total deliveries for 1913 were 43,900 tons and for 1912 49,500 tons. The total visible supply December 31, 1913, was 13,893 tons, which is 2916 tons above that of December 31, 1912. Stocks and landing December 31 consisted of 2199 tons.

Lead.—The market is dull and weaker, with the American Smelting & Refining Company taking practically all the business as the lowest seller, but it is not believed that there is a great deal of buying going on. The weakness first developed in the West, where 4.05c., St. Louis, is quoted. The New York price is 4.15c.

Spelter.—As a consequence of demand easing off, spelter has declined a few points and is now quoted at 5.30c. to 5.35c., New York, and 5.15c. to 5.20c., St. Louis. The galvanizers in particular seem to have less need for the metal. The higher trend in prices of recent date caused the base price of sheet zinc in carload lots to be advanced 25c. per 100 lb. to \$7.50 for 100 lb., less 8 per cent. discount f.o.b. cars, Peru, Ill. Extras and discounts are unchanged.

Antimony.—This metal has continued dull and without feature at 7c. to 7.25c., for Hallett's, 7.45c. to 7.60c. for Cookson's and Chinese and Hungarian grades at 6c. to 6.50c.

Old Metals.—The market has relapsed to dullness. Dealers' selling prices remain unchanged as follows:

	Cents per lb.
Copper, heavy and crucible	14.00 to 14.25
Copper, heavy and wire	13.50 to 13.75
Copper, light and bottoms	12.25 to 12.50
Brass, heavy	8.50 to 8.75
Brass, light	7.50 to 7.75
Heavy machine composition	12.25 to 12.50
Clean brass turnings	8.50 to 8.75
Composition turnings	10.75 to 11.00
Lead, heavy	3.90
Lead, tea	3.65
Zinc, scrap	4.10

Chicago

JANUARY 5.—Following heavy sales, copper last week passed through a natural reaction during which transactions were light and prices unchanged. Tin quotations fell off rather sharply, but spelter and zinc recorded added firmness and higher values are reported. We quote as follows: Casting copper, 15c.; Lake copper, 15.50c., for prompt shipment; small lots, ¼c. to ½c. higher; pig tin, carloads, 37.75c.; small lots, 39.75c.; lead, desilverized, 4.10c. to 4.15c., and corroding, 4.35c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.15c. to 5.20c.; Cookson's antimony, 9.50c.; other grades, 8c.; sheet zinc, \$7.50, f.o.b. La Salle or

Peru, Ill., less 8 per cent. discount in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 11.75c.; copper bottoms, 10.50c.; copper clips, 11.25c.; red brass, 10.75c.; yellow brass, 7.75c.; lead pipe, 3.50c.; zinc, 3.75c.; pewter, No. 1, 23c.; tin foil, 28c.; block tin pipe, 31c.

St. Louis

JANUARY 5.—The market for Missouri metals has improved. Lead is quotable at 4.10c.; spelter, 5.25c.; electrolytic copper, 15.22½c. to 15.35c.; Lake copper, 15.75c. to 15.85c.; tin, 37.10c. to 37.35c.; Cookson's antimony, 7.80c. to 7.95c. In the Joplin ore market the premium grades of zinc sulphide ores brought as high as \$45 per ton. The basis range was wide, however, running from \$37 to \$42 for 60 per cent. Higher prices are considered likely. Calamine brought \$19 to \$20 for 40 per cent., with the best settlements as high as \$25. Lead ore continued weak, with sales on a basis of \$48 for 80 per cent., but hopefulness of better figures this week. Miscellaneous scrap metals are quoted as follows: Light brass, 4.50c.; heavy yellow brass, 7c.; heavy red brass and light copper, 8.50c.; heavy copper and copper wire, 9.50c.; zinc, 2.75c.; lead, 3c.; pewter, 22c.; tin foil, 28c.; tea lead, 2.75c.

Iron and Industrial Stocks

NEW YORK, January 7, 1914.

The stock market has been quite uniformly strong the past week, stimulated by a number of favorable developments, particularly the improvement in the demand for bonds. It is believed that those having money for investment are now showing a greater disposition to purchase securities. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chal., com.	8¼-9	Pressed St'l, com.	26¼-27¼
Allis-Chal., pref.	43-44	Pressed St'l, pref.	96½-96¾
Am. Can., com.	28¼-31¼	Ry. Spring, com.	25¼-25½
Am. Can., pref.	89-90¾	Ry. Spring, pref.	96½-96¾
Am. C. & F., com.	44¼-45	Republic, com.	19¾-20½
Am. C. & F., pref.	112-113	Republic, pref.	80-80½
Am. Loco., com.	31½-33¼	Rumely Co., com.	15-15½
Am. Loco., pref.	96¼-97	Rumely Co., pref.	35½-36½
Am. Steel Fdries.	28-28½	Sloss, com.	27
Bald. Loco., com.	39	Pipe, com.	10½-10¾
Bald. Loco., pref.	104	Pipe, pref.	40-40½
Beth. Steel, com.	29½-30¼	U. S. Steel, com.	57½-59¾
Beth. Steel, pref.	68-68¾	U. S. Steel, pref.	106-107¼
Case (J. I.), pref.	91	Westhouse Elec.	64-66¼
Colorado Fuel.	28½-30½	Am. Ship, pref.	80-82
Deere & Co., pref.	91¾-92	Chic. Pneu. Tool.	51-52¾
General Elec.	138¼-141	Cambria Steel.	48-48½
Gt. N. Ore Cert.	33¼-34¼	Lake Sup. Corp.	21½-22
Int. Harv., com.	100¾-102	Pa. Steel, pref.	60
Int. Harv., pref.	113½-114	Cruc. Steel, com.	14¾-14¾
Int. Harv. Corp.	100¾-104	Cruc. Steel, pref.	87½-90
Int. Harv. Corp., pref.	114¾-115	Harb. Wk. Ref., com.	48
Int. Pump, pref.	19	Harb. Wk. Ref., pref.	99
Pittsburgh St'l, pref.	88	La Belle Iron, com.	40
		La Belle Iron, pf.	116¼-116¾

Additional Pittsburgh Market News

PITTSBURGH, PA., January 7, 1914.—(By Telegraph.)—It is reported that Corrigan, McKinney & Co. have blown out two of their five blast furnaces and will put out the other three in a short time. They announced more than a week ago that rather than pay the high prices ruling for coke they would put their furnaces out of blast. The Westinghouse Air Brake Company has purchased from 12,000 to 15,000 tons of foundry and forge iron for delivery over the first half of this year. The foundry iron was bought on the basis of about \$12.75, Valley, for No. 2, but the forge iron was bought from furnaces outside the Valley. The very low prices ruling on foundry, forge and basic iron are attractive to consumers and there is more active inquiry at present than for some months.

It is now stated that the leading Youngstown steel interest which recently bought 30,000 tons of Connellsville coke per month for delivery over first six months or the whole year secured it on the basis of about \$1.90 per net ton at oven.

Ferromanganese has been reduced \$2 per ton by English makers and is now quoted at \$45, Baltimore. Freight to Pittsburgh is \$2.16. Ferrosilicon prices are unchanged.

Important Wire Trade News

Under date of January 7, an announcement is being sent to buyers of wire products by Frank Baackes, vice-president and general sales agent of the American Steel & Wire Company, which reads as follows: "We beg to advise you that all quotations on wire products are withdrawn. We shall be pleased to name you our lowest prices, if in the market for our products."

Personal

M. J. Drummond, after serving four years as commissioner of charities of the city of New York, has resumed his active interest in the cast-iron pipe trade in connection with his firm of M. J. Drummond & Co., 51 Chambers street, New York. In recognition of his splendid services in the cause of the poor and the sick, a banquet will be given to him on January 27 at the Waldorf-Astoria by prominent citizens of New York City interested in public welfare and philanthropic work.

Clarence A. Earl, vice-president and general manager of the Corbin Screw Corporation, New Britain, Conn., the largest subsidiary of the American Hardware Corporation, has severed that connection to become second vice-president and assistant general manager of the Hendee Mfg. Company, Springfield, Mass., manufacturer of Indian motorcycles. He will be a right-hand man to President George M. Hendee. The Hendee Mfg. Company is the largest producer of motorcycles in the world, with a daily output of over 300 machines.

Edgar S. Cook, of the Warwick Iron & Steel Company, Pottstown, Pa., and B. F. Fackenthal, Jr., former president of the Thomas Iron Company, Easton, Pa., will sail for Europe on the Adriatic January 10 for a tour covering several months.

W. A. Allen, formerly with the Carnegie Steel Company, has resigned to become commercial engineer for the R. D. Nuttall Company, Pittsburgh, maker of cut gears. He has had extensive experience in the manufacture, selection and treatment of materials, which will be of value to him in his new position.

John G. Emery, Jr., secretary and treasurer and one of the directors of the Shaw Electric Crane Company, Muskegon, Mich., has resigned and will engage in other business. Frank E. McNee will succeed Mr. Emery as secretary and Thomas C. Akin will take the position of treasurer.

William T. Donnelly, consulting engineer, 17 Battery place, New York, has returned after an absence of 11 weeks in which he spent some time in Galveston, Los Angeles, Prince Rupert, Canada, and Honolulu, H. I. He visited the last-named city in connection with the placing in commission of a dry dock for which he had the contract. He has similar work under way in Prince Rupert.

E. M. Chadwick, formerly with the Fairbanks Company, has been appointed manager of the Buffalo branch of Manning, Maxwell & Moore, railroad and machinists' tools and supplies and electric traveling cranes. D. A. Hamilton, formerly with the Reed-Prentice Company, Worcester, Mass., has been appointed assistant at Manning, Maxwell & Moore's Detroit branch.

Thomas Towne, former general manager of sales of the Union Drawn Steel Company, has been elected second vice-president of the Gurney Elevator Company, whose office is at 62 West Forty-fifth street, New York City, and factory at Honesdale,

Pa. He will have charge of all sales and branches outside of Greater New York.

M. P. Fillingham, 50 Church street, New York, has been appointed New York representative of the Falk Company, Milwaukee, Wis., maker of helical gears. His territory will include all of New York, New Jersey and Philadelphia, Pa.

L. P. Ross, general manager of the Northern Iron Company, operating blast furnaces at Port Henry and Standish, N. Y., was, on Christmas Day, presented by the employees of the Standish plant, with a silver coffee service, tastefully and appropriately engraved, as an expression of their cordial and friendly relations.

R. C. Webster, sales manager of the Crucible Steel Company of America, at Cincinnati, Ohio, has returned from a holiday trip to several cities in the Northwest and Canada.

E. W. Edwards, president Edwards Mfg. Company, Cincinnati, Ohio, was host at a banquet served to the sales department heads of that company, at the Cincinnati Business Men's Club, on the evening of December 29. Over 60 guests were present, including a number of foreign representatives.

Robert Crane, manager of the Prentiss Tool & Supply Company's office in Buffalo, N. Y., is combining a pleasure and business trip to his former home in Cincinnati, Ohio. He will visit the leading machine tool plants before returning.

Obituary

JOHN H. SCHUMANN, founder of the Moller & Schumann Company, manufacturer of varnishes, enamels and japans, Brooklyn, N. Y., died December 31, aged 74 years. He was born in Mannheim, Germany, and came to this country about 60 years ago. In 1863 he engaged in business as one of the partners of Moller, Knaepp & Co., varnish manufacturers. Six months afterward he and Mr. Moller bought out the entire business and continued active in its affairs up to four years ago, when he relinquished the management to his four sons and the present company was formed. He was president of the German Savings Bank of Brooklyn and a director in the Title Guarantee & Trust Company and Citizens Trust Company. He was a charter member of the Manufacturers' Association of New York, in which he was active for many years. His death will make no change in the control or policy of the Moller & Schumann Company. He leaves a widow, two daughters and four sons, John H., Jr., Carl J., Frank M. and Alvin G. Schumann.

GEORGE HERRICKS BILLINGS, Boston, Mass., president of the Compressed Steel Shafting Company, died December 31, aged 68 years. He was a native of Taunton, Mass. After graduating from the Massachusetts Institute of Technology he learned the steel business, beginning as a roll turner and working through the various departments until he became a manager. Since 1889 he had been a manufacturer of cold-drawn steel, and was the inventor of various devices used in the drawing of rods for shafting. He was a member of the American Society of Mechanical Engineers, and was known as a metallurgical expert.

GEORGE W. KITTREDGE, Passaic, N. J., died January 2, aged 65 years. He was born in Dayton, Ohio. In 1879 he came to New York and specialized in the development of geometrical methods for laying out sheet-metal workers' patterns. Much of his work was given to the public through the Metal Worker, published by David Williams. These were collected

and published in book form under the title of "The Metal Worker Pattern Book," which has had a wide circulation and is still in great demand. In recent years he has been editor of the technical paper, Sheet Metal. He was also president of the Kit-Kat Club. He leaves one son, Clifford Kittredge.

EDWARD L. ADREON, vice-president American Air Brake Company, and former city comptroller of St. Louis, died at his home in St. Louis, Mo., December 29, aged 66 years. He was vice-president and general manager of the company from 1887 to 1910, when he retired from the last-named office, continuing only as vice-president. He was also director of the Adreon Mfg. Company, president of the Railway Supply Manufacturers' Association and president of the Emery Pneumatic Lubricator Company. He was a native of St. Louis and was prominent in civic movements.

JOHN WILLIAMS, one of the pioneers in this country of the ornamental bronze business, died January 5 at his home, Lawrence Park, Bronxville, N. Y., of heart disease, aged 72 years. He was born in Ireland, and came to this country as a young man. He was president of John Williams, Inc., 556 West Twenty-seventh street, New York, manufacturing ornamental bronze and wrought-iron work. He leaves a widow and a daughter.

CYRUS E. MEAD, founder and first vice-president of the Mead Engine Company, Dayton, Ohio, sustained injuries in an automobile accident January 4 which resulted in his death the following day. He was 40 years old, and at the time of his death he was interested in a number of manufacturing companies, in addition to the one bearing his name. He leaves a widow, two daughters and one son.

GEORGE T. CRAWFORD, connected with the tin plate plant of the McKeesport Tin Plate Company, McKeesport, Pa., died suddenly last week from heart failure, aged 50 years. He was a brother of E. P. Crawford, president of the company.

CHARLES R. BROWN, former president of the Huron Steel & Iron Company, Norwalk, Ohio, which was acquired several years ago by the Crucible Steel Company of America, died January 2 of pneumonia.

JAMES STORER, secretary of the George Worthington Company, Cleveland, Ohio, wholesale and retail hardware dealer, died suddenly January 2 of heart disease, aged 73 years.

MAX ROSENBLUM, president Northwestern Iron & Metal Company, Kenosha, Wis., died at Phoenix, Ariz., December 19, aged 48 years. He had gone there in the hope of recovering his health.

JAMES T. HADLEY, secretary and treasurer of the Reid Gas Engine Company, Oil City, Pa., died December 22, aged 42 years.

The Bettcher Mfg. Company, Cleveland, Ohio, has added to its line the manufacture of two products that are of interest to plumbers and steam fitters. One of these is a one-piece band ring for pipe hangers and the other is an extension bar. The band ring is made of open-hearth steel in sizes from $\frac{1}{2}$ to 12 in. in diameter. The extension bar is made of open-hearth steel in five sizes for pipe from $\frac{1}{2}$ to 12 in. It has holes for bolts $\frac{3}{8}$ in. apart. The bar is furnished in 10-ft. lengths, but can be easily cut to any required length. The five sizes have a range of $\frac{7}{8}$ in. to $1\frac{1}{2}$ in. in widths, 14 gauge to $\frac{1}{4}$ in. in thickness and $\frac{1}{4}$ to $\frac{3}{8}$ in. bolt hole.

Pittsburgh and Valleys Business Notes

The report that A. M. Byers & Co., Inc., Pittsburgh, will lease the Mahoning Valley works of the Republic Iron & Steel Company at Youngstown, Ohio, which contains a puddling plant, is officially denied.

The strike at the Phillips Sheet & Tin Plate Company's Pope works, at Steubenville, Ohio, which has been in effect since June 30, has been settled through the efforts of the chamber of commerce of that city. A scale agreeable to both sides was signed. All the old employees return to work without any discrimination against them.

At a stockholders' meeting of the Wheeling Mold & Foundry Company, Wheeling, W. Va., to be held the latter part of January, the directors will recommend an increase in the capital stock from \$750,000 to \$1,000,000. A cash dividend of two per cent. was declared by the directors, but it was decided to recommend a stock dividend of 10 per cent. in lieu of the cash dividend. This recommendation was decided on because of the large amount of business handled and the success of the company last year.

A prominent railroad operating in western Pennsylvania has in service a gear that has made 583,000 miles. It is an untreated normal case steel gear, and is said to be good for at least 100,000 miles more. This seems like a remarkable statement, but the same road has 50 other gears that have made equally good records. They were all made by the R. D. Nuttall Company, Pittsburgh, the largest manufacturer in the world of cut gears.

The Ideal Tool & Mfg. Company, Beaver Falls, Pa., has filed notice at Harrisburg of an increase in its stock from \$5000 to \$75,000.

The Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa., received during 1913 several important contracts for hydroelectric development in Alaska that are expected to do much to improve mining operations in that part of our domain. The most important of these is the new generating unit for the Alaska Treadwell Gold Mining Company, consisting of a 2350 kva. waterwheel generator driven by a Pelton waterwheel running at 300 r.p.m., generating about 3000 hp.; another is a 300-kva. waterwheel generator to be installed by the Chichagoff Mining Company; a third in a 200-kva. waterwheel generator, together with all the necessary switchboard and accessories, for the Kennecott Mines Company, operating one of the highest grade copper mines in the world, located in the Copper River district; a fourth is a 1012 kva. waterwheel generator to be driven by a Pelton wheel, for the Alaska Juneau Gold Mining Company.

Charles N. Hays, of the Charles N. Hays Company, agent for power-plant manufacturers, Pittsburgh, has taken over the management of the Pittsburgh Galvanizing Company, Pittsburgh. It is proposed to put new equipment in the plant and make it modern in every way. The company is in the market for machinery in connection with this work.

The Carborite Steel Bit Company, Westinghouse Building, Pittsburgh, manufacturer of bits for coal-mining machines, has completed an ingenious machine for the production of steel bits, which has been installed in its works at Braeburn, Pa. The machine is designed to operate at 50 r.p.m. and to turn out a finished bit for each revolution. The company is manufacturing a number of these machines with a view of selling them direct to coal operators and manufacturers of bits, and supplying carborite steel of the proper size

for bits. The machines also sharpen old bits as fast as they make new ones.

Mary furnace of the Ohio Iron & Steel Company at Lowellville, Ohio, which has been blown out, will be relined and repaired. A new blowing engine will be installed, and a fifth fire-brick stove will be built. In the last six months of 1913 this stack made an average of 406 tons of iron per day, the maximum output for one day having been 459 tons. It is expected that it will resume blast again about March 1.

C. L. Doyle, who was recently appointed Pittsburgh representative of the Producers Coke Company, Uniontown, Pa., has resigned because of a decision to continue the business of the Pickands-Magee Company, Pittsburgh, Mr. Doyle continuing with the latter company as president. Some time ago the Consolidated-Connellsville Coke Company and the Wheel Coke Company, formerly represented by the Pickands-Magee Company, became identified with the Producers Coke Company and will so continue. The offices of the Pickands-Magee Company are in the Oliver Building, Pittsburgh.

The Westinghouse Gear & Dynamometer Company has been organized with a capital stock of \$1,500,000 and with general offices at East Pittsburgh, Pa. The company owns all the United States and foreign patents on the Westinghouse-Melville-Macalpine system of reduction gearing and will issue licenses to manufacture and sell the gears. George Westinghouse is president; H. T. Herr, vice-president; T. S. Grubbs, secretary and treasurer; George F. White, assistant secretary and treasurer.

The George J. Hagan Company, People's Bank Building, Pittsburgh, has received a contract for the building of a stoker-fired, double annealing furnace in the sheet mills of the Whitaker-Glessner Company, Wheeling, W. Va. A number of sheet and tin-plate mills took advantage of the holiday shut-down to have the George J. Hagan Company install automatic stokers for the operation of heating and annealing furnaces. These include the McKeesport Tin Plate Company, Trumbull Steel Company, and the Phillips Sheet & Tin Plate Company.

Extensions and improvements under way for some time at No. 2 works of the Union Drawn Steel Company, Beaver Falls, Pa., have been completed and the plant was put in full operation last Monday. The company manufactures cold drawn shafting and other specialties.

The structural section of the Engineers' Society of Western Pennsylvania met in Pittsburgh on Tuesday evening, January 6, and a paper was read by Edward Godfrey, structural engineer of the Robert W. Hunt Company, Pittsburgh, on "The Strength of Equipment in Handling Loads." This was also the annual meeting of the section.

Mackintosh, Hemphill & Co., Pittsburgh, builders of engines and heavy rolling mill and steel works equipment, have bought from the Pennsylvania Railroad additional ground adjacent to their works with the intention of using it at some future time for plant additions.

The Sligo Iron & Steel Company, Connellsville, Pa., has resumed operations after a shut down over the holidays. It is equipped with one double and 21 single puddling furnaces, manufactures iron and steel bars and plates and wrought-steel floor plates, and has a maximum annual capacity of about 30,000 tons.

At Pittsburgh, on January 5, preliminary action was taken to form a local branch of the National

Council for Industrial Safety, and a committee of prominent business men was named to take charge of the matter. John Price Jackson, commissioner of labor and industry for Pennsylvania, is interested in the formation of the branch and has directed Lew R. Palmer, his assistant commissioner, to co-operate with H. M. Wilson, of Pittsburgh, who is a director of the National Council.

Blast Furnace Notes

The blast furnace of the Delaware River Steel Company, Chester, Pa., produced 6483 tons of pig iron in December, exceeding the best previous month's record for that furnace by 600 tons.

The Central Iron & Steel Company blew out its No. 1 Paxton furnace at Harrisburg, Pa., December 31. Both the company's furnaces are now idle.

The Columbus Iron & Steel Company, Columbus, Ohio, blew out one of its two stacks December 31. It will not resume operations until pig-iron prices have improved materially.

The Wickwire Steel Company blew out one of its furnaces at Buffalo January 8. The time of its resumption is indefinite.

The National Tube Company had its four furnaces at McKeesport banked at the turn of the year. Three were idle 11 days in December and the fourth was idle 25 days.

Alice furnace of the Valley Mold & Iron Company, Sharpsville, Pa., which was blown out December 29 will be idle for an indefinite time.

The Cambria Steel Company had seven of its eight blast furnaces in operation January 1. The idle furnace is being rebuilt.

The Oriskany Ore & Iron Corporation blew out its furnace at Lynchburg, Va., December 18, to install a new water system. The furnace will probably resume by January 15.

The Maryland Steel Company had one of its four blast furnaces in operation January 1, furnace D having been banked December 19. Furnace C is being rebuilt and furnace A is out for relining.

Hannah furnace of the Republic Iron & Steel Company at Youngstown, Ohio, was blown out December 28. One of the company's four Haselton stacks is idle, having gone out December 13.

Three of the blast furnaces of the National Tube Company at Lorain, Ohio, were banked from December 20 to the end of the month.

One Crane furnace of the Empire Steel & Iron Company at Catasauqua, Pa., which has been relined and repaired in recent months, will be blown in this week. The entire Crane group has been idle since October.

At present No. 2 blast furnace of the Pittsburgh Steel Company at Monessen, Pa., is out of blast, but No. 1 is operating and is making close to 500 tons of basic iron per day, which is used in the open hearth steel works of the company at Monessen.

On the evening of January 1 a "slip" at the Vanderbilt furnace of the Woodward Iron Company, at Boyles, Ala., resulted in the death of five men and injury to several others.

It is expected that one of the stacks of the Cleveland Furnace Company, Cleveland, will be blown out this week.

The blast furnace of the Longdale Iron Company, Longdale, Va., which has been idle for some time is to be dismantled and the material sold for scrap.

The report that Sheridan furnace, of the Berkshire Iron Company, Sheridan, Pa., which has been idle for over a year, would be blown in is denied by representatives of the company.

Decline in Exports with Drawback Allowance

Why Exports With Benefit of Drawback in Duties on Imported Material Used Have Not Kept Pace With Increase in Total Exports

WASHINGTON, D. C., December 29, 1913.—Official figures showing the recent export movement of manufactures with benefit of drawback of the duty paid on imported materials used in their production, have been prepared for *The Iron Age* by the Bureau of Foreign and Domestic Commerce. According to these statistics, in the fiscal year 1913 there was a gain in the total exports of manufactured products of 16 per cent. as compared with 1912, and of 30 per cent. as compared with 1911, while the total drawbacks paid in 1913 increased less than one-half of one per cent. over 1912, and declined nearly 30 per cent. as compared with 1911. It will thus be seen that the exports with benefit of drawback, instead of showing a proportionate increase as compared with the total exports of manufactured articles, have declined heavily. Extraordinary efforts have been made in the past four or five years both to utilize the existing drawback law for the extension of foreign trade and to secure more liberal regulations under the existing law and the enactment of a less restrictive statute. But Congress, in the recent revision of the tariff law, has taken a long backward step in the amendment of the drawback section so as to entirely cut off refunds of duty on the exportation of by-products, except where similar by-products of foreign origin are dutiable under the Underwood act. Manufacturers will find quite inexplicable the action of a tariff reform Congress in cutting off a highly important class of refunds which in the past have constituted not only a great aid to the building up of our export trade but also to the cheapening of many important materials for domestic consumption.

The relation between the total exports of manufactures and the exports of manufactured goods with benefit of drawback during the past nine years is shown in the following table:

Fiscal year	Exports of manufactures	Drawbacks paid
1905.....	\$611,425,574	\$5,806,475
1906.....	686,023,169	5,831,124
1907.....	740,314,557	5,445,150
1908.....	742,575,841	6,637,602
1909.....	671,416,014	6,604,432
1910.....	768,309,063	6,182,375
1911.....	907,519,841	6,402,603
1912.....	1,020,417,687	4,525,570
1913.....	1,185,104,309	4,543,536

It will be seen from this table that the exportation of goods made in whole or in part with foreign materials eligible to drawback of duties reached high-water mark in 1908, when the increase over the preceding year was proportionately large when compared with the slight gain in the export of manufactures. The increased utilization of the drawback law in 1908 was very largely due to the movement to secure a more liberal statute which brought to many manufacturers their first knowledge of existing opportunities to extend their foreign trade. In the year referred to the Treasury Department promulgated an unusually large number of drawback regulations under which many manufacturers operated for a year or more, only to abandon them after the cost of complying with the stringent regulations of the department became clearly apparent. In 1910 certain large producers

increased their output of export goods which enabled the year to show a record not far below high-water mark although there was a material decline in the number of regulations in force.

The total drawbacks paid on articles manufactured in whole or in part of materials dutiable under the metal schedule of the tariff during the fiscal year 1913 as compared with 1912, are shown in the following table:

Articles exported	Drawbacks paid	
	1912	1913
Agricultural implements	\$314	\$1,267
Aluminum rods and coils.....	133,357	82,230
Aluminum kitchen and table ware.....	.....	403
Aluminum plates and sheets.....	87,819	158,187
Aluminum galvanizing flux.....	22	.....
Aluminum vacuum cleaners, and parts of .....	.....	2,079
Aluminum lightning arrestors, and parts of	996	1,600
Aluminum, all other manufactures.....	.....	953
Babbitt and similar metals.....	9,915	8,684
Cars: automobiles	2,456	3,773
Cars, automobiles, parts of.....	1,487	5,950
Cars: passenger and freight for steam railroads	4,551	3,639
Cars: passenger and freight for other railroads .....	.....	64
Cycles and parts of.....	381	1,990
Electrical cable	36,867	45,077
Other electrical appliances.....	3,092	461
Bar iron	353	.....
Bars and rods of steel.....	14,141	493
Billets of steel.....	84	39
Iron sheets and plates, galvanized.....	6,011	59,969
Steel saw plates.....	563	5,311
Structural iron and steel.....	192	1,049
Steel wire	237	.....
Steel wire, galvanized.....	10,616	30,606
Steel wire rope.....	17,409	19,186
Steel wire, all other manufactures of.....	.....	460
Builders' hardware, locks, hinges, etc.....	1,880	2,234
Saws	16,406	14,670
Castings, not elsewhere specified.....	1,748	74
Cutlery	7,623	18,568
Hose, flexible metal.....	752	92
Machinery, electrical.....	908	3,297
Sewing machines	5,651	5,904
Locomotives	22,503	18,056
All other engines and parts of.....	8,163	5,712
Sugar mill machinery.....	9,525	3,272
All other machinery.....	877	1,105
Nails, cut	5,710	31
Nails, horseshoe	1,266	848
Needles	3,694	3,845
Pipes and fittings.....	3,765	603
Rail joints, continuous.....	16,235	10,008
Steel rails	16,994	8,197
Scales	216	136
All other manufactures of iron and steel.....	771	846
Lead, tin foil.....	30,434	32,831
Lead pigs and bars.....	1,455	1,833
Lead pipes and fittings, etc.....	4,174	4,731
Lead seals	7,754	8,441
Lead sheets	2,599	6,795
Lead shot	7,323	13,973
Type metal	1,397	2,251
All other manufactures of lead.....	1,687	1,317
Metal containers, not including tin cans..	20,760	27,153
Tin cans	407,626	70,856
Tin sheets, embossed.....	1,978	546
Tin plates, lithographed.....	2,776	2,392
Trunk tin sheets.....	830	.....
All other manufactures of tin.....	1	64
Shade rollers	4,519	2,432
Zinc plates	16,156	.....
Zinc shavings	906	372
Total	\$966,343	\$706,785

The generally precarious character of the ex-

port trade with benefit of drawback, as it has been able to exist under the laws in force in the past two decades, is clearly indicated in the above table. Marked fluctuations are noted throughout the list, showing that refunds are obtainable only on occasional orders and that it is very difficult to build up a steady trade under the regulations which the Treasury Department has felt justified in promulgating under the drawback law.

For many years the item of drawback on tin cans was of overshadowing importance. These cans were used as containers for petroleum exported by the Standard Oil Company and were manufactured of Welsh plate on which the Government allowed a refund of 99 per cent. of the duty. As long ago as 1902 the American Tin Plate Company undertook to secure a part of this business and succeeded in doing so through the operation of an unofficial drawback, equal to the duty, which it allowed on cans manufactured of domestic plate. Under certain conditions, however, it was still profitable to utilize Welsh plate and very large quantities were annually consumed in the production of oil containers until the last fiscal year during which no imported plate was used until the month of April. It is understood that during the first four months of the new fiscal year there has been a marked increase in the amount of foreign plate imported for this purpose.

The exportation of aluminum products with benefit of drawback has made a notable record in recent years. In 1909 the total refunds under this head amounted to but \$52,675, but this amount has steadily increased until in 1913 the total drawback paid on the exportation of aluminum products of all kinds aggregated nearly a quarter of a million dollars.

NATURE OF MATERIALS IMPORTED FOR DRAWBACK

A brief examination of the drawback records showing the exact nature of the imported materials which entered into the exports enumerated in the above table will be of interest. The bar iron exported with benefit of drawback was manufactured from imported scrap iron, while the bars, rods and billets were made of imported scrap iron and steel and a considerable quantity of old steel rails, the superior condition of which precluded their entry as scrap. The galvanized-iron sheets and plates were made of domestic iron coated with zinc imported in the form of blocks and pigs. The steel saw plates were made of imported bands of steel. Foreign iron ore was used in the production of the structural iron and steel, while wire rods and imported pig zinc were employed in the production of the wire embraced in the table. The steel wire rope, however, was made of finished foreign steel wire made into rope after importation. Foreign steel ingots were imported for the builders' hardware mentioned, while steel sheets, bands and plates were brought in to make the saws enumerated. Both foreign ore and pig iron entered into the castings embraced in the table.

An excellent illustration of the care with which American manufacturers are watching the smallest details in the cost of production is shown in the drawbacks paid on sewing machines. Nearly 400,000 of these machines were exported in 1913 with benefit of drawback of duty paid upon such insignificant items as the lithographic prints and surface-coated paper used to decorate the machines and their cases. A great variety of articles were brought in for the manufacture of locomotives exported with benefit of drawback, including brass tubes, copper pipes, steel boiler tubes, wheels and

tires, steel channels, steel brake-work, and other metal manufactures in addition to bar iron and charcoal-iron blooms. The most important foreign material used in the manufacture of locomotives for export was brass tubing.

THE NEW DRAWBACK SECTION

The difficulties encountered by American manufacturers in their efforts to take advantage of the drawback law to stimulate their export trade have been materially increased by the amendment incorporated in the drawback section of the new tariff law. For more than two decades a systematic campaign has been in progress to liberalize the law and various measures looking to this end have been presented to Congress and have made more or less headway in connection with the revisions of 1890, 1897 and 1909. Shipbuilders constructing vessels for foreign account have been granted drawback on certain imported materials by statute and the Treasury Department several years ago removed a serious restriction by a sweeping ruling permitting manufacturers to show the use of imported materials in their finished products by exhibiting their manufacturing records, in place of requiring them to actually identify the imported materials in the goods exported. When the new tariff law, which became effective October 3 of the current year, was in the hands of the Senate, however, an amendment was injected in the drawback section at the instance of the Treasury Department so entirely at variance with the theory upon which the heavy reductions throughout the schedules were based as to be almost incomprehensible. This amendment was in the form of a proviso as follows:

Provided, That where a principal product and a by-product result from the manipulation of imported material and only the by-product is exported, the proportion of the drawback distributed to such by-product shall not exceed the duty assessable under this act on a similar by-product of foreign origin if imported into the United States. Where no duty is assessable upon the importation of a corresponding by-product, no drawback shall be payable on such by-product produced from the imported material; if, however, the principal product is exported, then on the exportation thereof there shall be refunded as drawback the whole of the duty paid on the imported material used in the production of both the principal and the by-product, less 1 per cent. as hereinbefore provided.

This amendment cuts off a large class of drawbacks and in certain industries will operate to put important plants out of business. A few illustrations will show the effect of the law. Under the act of 1909 a shipbuilder or other manufacturer using imported steel plates could send his scrap to Canada, or some other convenient foreign place, and secure a substantial proportionate drawback of the duty paid on the foreign plates. Under the tariff act of 1913, however, scrap iron and steel are on the free list, and, therefore, although imported steel plates pay a duty, this domestic manufacturer using them in the building of a ship or in the production of some other article for export is denied the drawback. A very large business was built up under the act of 1909 in the manufacture of linseed oil for the paint trade from imported flaxseed, a vital factor being the drawback which the oil mills were allowed on the exportation of the oil cake which was a by-product of the industry. The refund on the oil cake operated to reduce the cost of production of the oil which was put on the domestic market. Under the present law, however, oil cake being a by-product, the Treasury Department has withdrawn the regulation allowing drawback upon its exportation and there is no longer any incentive to the manufacturer to import foreign

flaxseed for the production of linseed oil for domestic consumption.

WHY THIS AMENDMENT WAS SOUGHT

The argument employed by the Treasury Department to secure the incorporation in the drawback section of the amendment above quoted was certainly extraordinary in view of the avowed purpose of the framers of the new tariff to reduce duties and to provide cheaper raw materials for manufacture as well as to cut down the cost of living. Citing the linseed oil case above referred to and the cases of several other commodities manufactured in this country from imported materials for domestic consumption of the main product while the by-products were exported with benefit of drawback, the Treasury Department officials called attention to the fact that, because the chief product was sold in the domestic market, the allowance of drawback on the exportation of the by-product "operated as a reduction in the duty on the chief product." Thus, it was asserted, the linseed oil

mills enjoyed the important advantage over importers of foreign linseed oil and also over domestic producers using home-grown flaxseed.

It might have been supposed that arguments like these, having for their object a decided increase in the cost of products made from imported materials, would have fallen upon deaf ears when Congress was engaged in a general slashing of tariff schedules, but, strange as it may seem, the Senate Finance Committee adopted the department's suggestion and the House Ways and Means Committee concurred in the amendment in conference.

When a Congress committed to the downward revision of the tariff ignores every argument in support of a more liberal drawback that has been put forward in the past 25 years and revises the drawback section in such a way as to greatly increase the difficulty of utilizing its provisions, it is not surprising that American manufacturers who have hoped for assistance in the development of their export trade should feel discouraged.

W. L. C.

Many Plant Extensions in Cleveland District

Industrial Expansion in Metal Working Industries Continued at a Noteworthy Rate in Northern Ohio During 1913

The year of 1913 was one of steady development and progress in industrial activity in Cleveland, and this growth was enjoyed to a similar extent by many of the thriving manufacturing cities located in the northern section of Ohio reaching from the busy steel mill towns of the Mahoning Valley to Toledo on the west and taking in the smaller Lake ports. While it is true that the change from factories overcrowded with orders to operations much below capacity, with uncertainty about the future, caused the holding up of some contracts for new plants and additions, the unfavorable change, coming as it did in the latter part of the year, did not result in a suspension of building work under way. In a few cases where plans had not reached the contract stage, construction was delayed until conditions become more auspicious, but this delay was for the most part by companies manufacturing products used in the making of automobiles.

LITTLE AUTOMOBILE EXPANSION

Expansion of the automobile industry, that continued during previous years in Michigan and other central western territories, slackened down before the beginning of 1913 and in the past year, with one or two exceptions, there was little increase in their manufacturing capacity by automobile manufacturers. Makers of automobile parts, who had kept pace with the demand, also were inclined to go slow in further increases. As a result the industrial growth in metal working fields in northern Ohio last year was in a variety of manufacturing lines, for the most part not directly connected to the automobile industry. Having confidence in the future manufacturers in various lines are going ahead with projects that will enable them to increase output and be ready to supply the increased demand for manufactured articles resulting from the country's steady growth as soon as the present hesitancy has disappeared and business is again moving along at its normal pace.

Developments in steel making in Cleveland in

1913 will cause the city to forge a long way ahead as a steel center. Late in the year the work of erecting the new plants of Corrigan, McKinney & Co. and the Otis Steel Company was started. One mill of the latter will be ready for operation early in the summer, and the plant of the latter early in 1915. The building plans of Corrigan, McKinney & Co. include the erection of two additional blast furnaces, contracts for which are to be placed early in the year. The Otis plant now under way is a light plate mill, being the first unit of a complete steel-making plant. These projects are referred to more fully elsewhere in the resume of the country's iron and steel works construction for 1913.

EXTENSIONS IN CLEVELAND METAL TRADES

Among the more important building projects carried out in Cleveland and vicinity during the year, including new plants and enlargements of old ones, are the following:

New buildings erected by the National Lamp Works of the General Electric Company provided floor space aggregating 500,000 sq. ft. These buildings included lamp factories, a factory for the manufacture of electric fixtures, a large glass plant, office buildings and laboratory buildings. Some of the latter were added to Nela Park group in East Cleveland, being a continuation of an extensive building programme carried out by this company in the preceding year.

The Cleveland Foundry Company completed a large six-story brick and steel factory building, replacing some old buildings and largely increasing its capacity.

The Cleveland Hardware Company completed a five-story-and-basement addition to its No. 1 plant, the buildings being 80 x 155 ft., greatly enlarging its forging capacity.

Bardons & Oliver, makers of turret machines, completed during the summer a six-story addition, 56 x 130 ft.

The Hart Mfg. Company, maker of die-stocks,

built a two-story concrete factory building 110 x 165 ft.

The Cleveland Galvanizing Works Company erected a new plant five stories high and 40 x 120 ft.

The Willard Storage Battery Company acquired a site with buildings and this year a new four-story factory will be built 100 x 350 ft.

New plants for the commercial heat treating of steel were built by the Steel Improvement Company and by the W. S. Bidle Company.

A new plant was completed by the Atlas Car & Mfg. Company, 100 x 400 ft.

The Diebold Products Company established a new plant for the manufacture of automobile parts.

The S. F. K. Steel Barrel Company built a new plant 60 x 115 ft.

The National Screw & Tack Company completed late in the year a five-story-and-basement brick and steel building 54 x 210 ft.

A new plant was erected by the Adams-Bagnall Electric Company, a six-story steel and concrete building providing 60,000 sq. ft. of floor space.

The Linde Air Products Company built a new plant to supply air products for commercial purposes.

The Acme Foundry Company erected an extension 20 x 100 ft.

A new plant for the manufacture of automobile parts was established by the Commercial Auto Body & Mfg. Company.

The Park Drop Forge Company built an extension 80 x 100 ft. to its main shop. This was built for a machine shop and provides additional space for its forge shop in the portion of the plant formerly occupied by the machine shop.

The Upson Nut Company has about completed the first section of a hot forge shop at its bolt and nut works. During the present year the second section of this shop will be put up, making a complete shop 125 x 630 ft. This company has also built a large office building.

The Bowler Foundry Company has enlarged its foundry by an extension 56 x 107 ft.

The K. W. Ignition Company, maker of automobile parts, has built two plant additions each 60 x 125 ft.

The Elwell-Parker Electric Company has had plans prepared for a new four-story plant but has deferred building until business conditions improve.

An addition to the Cleveland automobile industry was made by the erection of a plant by the Chandler Motor Car Company. It is of steel and concrete construction, provides 60,000 sq. ft. of floor space, and its capacity will be doubled by additional building to be erected this year.

The Standard Steel Castings Company established a steel foundry early in the year and now has an addition nearing completion in which a second two-ton converter will be installed.

A new plant about 40 x 250 ft., one story, was completed late in the year by the Cleveland Machine Knife Company.

The Cleveland Castings Pattern Company has under construction a four-story fire-proof building 100 x 160 ft., which will be ready in March. The building will be occupied by this company and the affiliated Wood & Spencer Company.

The Cleveland Wrought Washer Company has just completed a new one-story plant 80 x 100 ft.

The Cleveland City Forge & Iron Company built a new power plant, made extensive changes at its works, added considerable new equipment and has under erection a large heat treating plant.

The W. S. Tyler Company is putting up a four-

story brick and steel building, about 50 x 145 ft., that will be used for office purposes.

AT OTHER NORTHERN OHIO POINTS

In Canton important additions were made to the steel works of the United Steel Company. A large plant was erected by the General Enameling & Stamping Company, controlled by the Berger interests, for the manufacture of kitchen ware. A new plant was completed by the Eller Mfg. Company for the manufacture of various formed metal building materials. This is 280 x 300 ft. The Canton Foundry & Machine Company built a new foundry, pattern storage building and other additions. Extensions were made to the plant of the Canton Drop Forging & Mfg. Company, increasing its manufacturing facilities about 25 per cent. The Wright Wrench & Forging Company enlarged its plant by a 50 x 100 ft. extension.

In Massillon a new plant was established by the Peerless Drawn Steel Company to manufacture drawn steel; also a new plant in Ravenna by the Cleveland Clutch Company; and in Painesville a new plant was completed by the Imperial Brass Foundry & Mfg. Company.

The Sykes Metal Lath & Roofing Company, Niles, acquired a new site on which it built a new plant which will largely increase capacity.

In Akron two large buildings have been erected by the International Harvester Company and these will be ready for occupancy early in 1914. One is 170 x 198 ft. and the other is 70 x 128 ft. Both are six stories. This plant is used for the manufacture of automobiles. A new steel foundry was built in Akron by the Akron Steel Castings Company. Another industry will soon be under way in Akron—a malleable foundry under the name of the Bacher Iron & Steel Company.

At Warren the Warren City Tank & Boiler Company built a temporary building to replace that destroyed by fire and will shortly receive bids for the erection of a large new permanent plant.

At Toledo, the Toledo Machine & Tool Company built a three-story extension to its main shop 100 x 150 ft. A new brass and aluminum automobile foundry, 100 x 296 ft., was built by the Willys-Overland Company.

New High-Speed Tool Plant

The new plant of the Latrobe Tool Works, Latrobe, Pa., has been completed and put in operation. The company, which is capitalized at \$60,000, was organized by the McKenna Brothers Company and other Pittsburgh interests for the manufacture of improved high-speed steel tools for use in structural shops, steel casting plants and machine shops. A building, 60 x 100 ft., was erected and equipped with machines for the manufacture of drills and reamers, which are now being placed on the market. The bit or cutting portion of the tools is made from Red-Cut Cobalt high-speed steel, which contains the usual percentages of chromium, tungsten and vanadium, with the addition of a percentage of cobalt; the shank is manufactured from high grade soft steel, and the two portions are electrically welded, the weld being reinforced to give additional strength.

The manufacture of puddled iron at the Rumelingen and St. Ingbert works, in Luxemburg, Germany, will be given up when present contracts are finished, bringing to an end this industry in that section. The reason given is that such iron cannot be produced with profit any longer in competition with steel.

Railroad and Equipment Building in 1913

One of the points emphasized in the annual statistical summary of railroad construction and equipment building as prepared by the Railway Age Gazette and contained in its issue of January 2, 1914, is that the railroads of the country have practically stopped ordering wooden cars for passenger service. Of the few which were ordered, most were for Canadian lines. No great numbers of all-steel box cars were ordered in 1913, but considerable development in this type of car is thought probable in the coming year. In steel frame box cars there was a heavy increase in the number ordered, most of the roads, as the Railway Age Gazette points out, appearing to favor the structural steel frame with inside horizontal sheathing. The larger portion of hopper cars were of all-steel construction, which was the case also with gondolas and flat cars, though to a lesser extent.

NO IMPORTANT INCREASE IN MAIN LINE

In 1913 there were completed in the United States 3071 miles of new first track, exclusive of second track and other multiple main tracks, side-tracks, etc. The total of new line built in 1913 is practically the same as in the two preceding years and with the exception of these years is the smallest since 1897, when only 2109 miles were built.

The number of companies reporting new mileage in the year was 238 and the construction was in 47 States, with Montana in the lead, with 356 miles. New main line mileage under construction at the end of 1913 totaled 1522; 1511 miles of additional line had been located and 1296 miles projected. In Canada 3013 miles of new first track were built in 1913 as compared with 2232 miles in 1912. In Mexico only 38 miles of line were built, as compared with 212 miles in 1912 and 351 in 1911.

FAIRLY GOOD YEAR FOR CAR BUILDERS

The figures show that the car builders had a fairly satisfactory year, having built 207,684 freight cars and 3296 passenger cars. The corresponding figures for 1912 were 152,429 freight cars and 3060 passenger cars. The total number of cars built each year, going back to 1906, was as follows:

Year.	Freight.	Passenger.	Total
1906*	240,593	3,167	243,670
1907*	284,188	5,457	289,645
1908*	76,555	1,716	78,271
1909*	93,570	2,849	96,419
1910*	180,945	4,412	185,357
1911*	72,161	4,246	76,407
1912†	152,429	3,060	155,489
1913†	207,684	3,296	210,195

*Includes Canadian output.

†Includes Canadian output and equipment built in railroad shops.

Of the freight cars built in the year just closed 198,066 were for domestic use and 9618 for export, the latter showing an increase of over 100 per cent. on 1912. Of the passenger cars 220 were for export. Of the freight cars 70,631 were of all-steel construction; 108,610 had steel underframes and 7237 were of all-wood construction. Of the passenger cars 2165 were of all-steel construction, 364 had steel underframes and 442 were of wood.

LOCOMOTIVE BUILDING BEST OF SEVERAL YEARS

The locomotives built in 1913, including Canadian output, totaled 5332 as against 4915 in 1912. Comparative figures going back to 1906, shown in the following table, indicate that more locomotives were built in the year just closed than in any year since 1907:

Year.	Number.	Year.	Number.
1906*	6,952	1910*	4,755
1907*	7,362	1911*	3,536
1908*	2,342	1912†	4,915
1909*	2,887	1913†	5,332

*Includes Canadian output.

†Includes Canadian output and equipment built in railroad shops.

Of the total built in 1913, 4561 were for domestic service and 771 were for export.

The year closed with fewer orders in hand than was the case at its beginning, some of the larger companies having orders but 10 to 30 per cent. of those of the first of last year. In the last few months orders have been few and small.

The total number of freight cars ordered in 1913 was 146,732, which includes orders placed with both merchant and railroad car shops. The estimate previously given in *The Iron Age*, 110,000 cars, related to orders placed with merchant shops only.

Change in a Veteran Iron House

Announcement is made that William M. Sanford has retired from the firm of Hannibal Green's Son & Co., Troy, N. Y. He had been a partner in the firm for the past 36 years and connected with it since 1856. He thus retires after nearly 60 years of successful business life and with a reputation for probity and business acumen which extends far beyond the immediate locality that has been the scene of his labors. He was born in Bennington, Vt., in 1838 and is thus in his seventy-fifth year. Edward M. Green, the remaining partner, states that the firm will continue under the same name as heretofore. It was established in 1809, or more than a century ago, and its sales have covered the entire country, much of the product of the Burden Iron Company having been distributed to the trade through the medium of this house, which has always carried a large stock of iron of every description.

The Falls Clutch & Machinery Company, successor to the Falls Rivet & Machine Company, Cuyahoga Falls, Ohio, has suffered some annoyance and embarrassment through the announcement of the bankruptcy proceedings in connection with the Falls Rivet & Machine Company, Kent, Ohio. The Falls Clutch & Machinery Company is an Ohio corporation, and the Falls Rivet & Machine Company, of New York and Boston, which is in no way affiliated with the former company, is incorporated under the laws of Maine. Those who have dealings with the Falls Clutch & Machinery Company should make note of this fact and observe that the bankrupt company is a completely distinct concern.

A continuous run of 128 hr., with the exception of two brief stops of a few seconds each, is credited to oil toppings used in a KisselKar truck motor at a recent commercial vehicle show in Los Angeles, Cal. The motor was driven at a rate of approximately 20 road miles an hour and therefore rolled up a mileage of 2,560. When the spark plugs were removed, they showed some encrusted carbon, it is stated, but none of the soft spongy deposit usually formed. A new carbureter, made in Los Angeles, was used for the test and it is claimed that, with this carbureter, the use of oil toppings at 3 cents a gallon is practicable for use in pleasure cars. There is a slight odor in burning the oil toppings.

AMERICAN SHIPBUILDING IN 1913

Atlantic Coast Shipyards Had Good Year—Lake Yards Have Better Prospects

Although the shipyards on the Atlantic Coast were by no means operated to full capacity in the past year, they were reasonably busy and many important vessels were turned out. On the Great Lakes the shipbuilding industry was dull, as indicated by the comparatively small number of vessels launched. General repair and dry dock work was fairly good, however, having been greatly increased by the big storm which swept the Lakes in November, inflicting heavy damage and causing a number of craft to be lost entirely. The damages and losses sustained in the fall of the year will insure several busy months in general repair work, while as a further result some new tonnage has already been contracted for. The yards on the Pacific Coast have in hand a considerable amount of naval work, although only a few naval vessels were completed in 1913. The tonnage of other classes of vessels, especially passenger steamers, was light.

WORK COMPLETED IN 14 LARGE YARDS

Statistics presented below, gathered from 14 of the leading American shipyards by International Marine Engineering, New York, to be published in its January issue and courteously given to *The Iron Age*, throw interesting light on the number of ships completed in the year, the gross tonnage or displacement of vessels built in each yard and the combined indicated horse power.

Merchant Construction

	No.	Gross tons	I. H. P.
American Shipbuilding Company....	16	57,769*	31,740
Newport News Shipbuilding & D. D. Company.....	7	35,873	22,550
New York Shipbuilding Company....	15	35,204	20,300
Maryland Steel Company.....	7	25,793	17,000
Wm. Cramp & Sons S. & E. Bldg. Company.....	4	22,800	11,400
Harlan & Hollingsworth Corporation	9	13,747	14,760
Fore River Shipbuilding Corporation	9	10,315*	6,150
Great Lakes Engineering Works....	12	9,888*	7,260
Manitowoc Shipbuilding & D. D. Company.....	6	2,778*	1,150
Seattle Construction & D. D. Company.....	4	2,642	8,070
Staten Island Shipbuilding Company	6	2,640	4,250
United Engineering Works.....	4	1,870	5,485
Bath Iron Works.....	1	306	275

Naval Construction

	No.	Tons displacement	I. H. P.
Newport News Shipbuilding & D. D. Company.....	2	38,160	13,400
Maryland Steel Company.....	1	19,250	7,000
Mare Island Navy Yard.....	1	19,230	6,300
Bath Iron Works.....	2	2,040	32,000
Wm. Cramp & Sons S. & E. Bldg. Company.....	2	2,020	32,000
Seattle Construction & D. D. Company.....	1	1,838	1,600
Fore River Shipbuilding Corporation	1	1,010	16,000

*Non-propelled vessels not included.

NEW MERCHANT TONNAGE GREATEST ON LAKES

The greatest amount of merchant tonnage, as indicated by the tables, was produced by the American Shipbuilding Company, operating several yards on the Great Lakes. The greatest volume of tonnage was produced by the Newport News Shipbuilding & Dry Dock Company, Newport News, Va. At this yard were built a number of large vessels, including the naval colliers *Proteus* and *Nereus*, of 19,250 tons displacement each, and a large amount of work is now in hand, including two battleships and a number of merchant vessels. The New York Shipbuilding Company, Camden, N. J., also turned out a heavy tonnage in merchant vessels, and at present has in hand the Argentine battleship *Moreno*, 27,650 tons; the Chinese cruiser *Fei Hung*, 2600 tons; the United States battleship *Oklahoma*, 27,500

tons, and several smaller naval vessels. The Maryland Steel Company, Sparrows Point, Md., delivered the naval collier *Jason*, 19,250 tons displacement, and several large merchant vessels, including three ships of 14,495 tons each for the American-Hawaiian Steamship Company, while three sister ships are under construction. The bulk of the tonnage turned out by the William Cramp & Sons Ship & Engine Building Company, Philadelphia, embraced four freight steamers for W. R. Grace & Co., New York. The Fore River Shipbuilding Corporation, Quincy, Mass., has in hand the Argentine battleship *Rivadavia*, 27,600 tons displacement; the battleship *Nevada*, 27,500 tons, and other naval and merchant work. The American Car & Foundry Company built a number of small craft with an aggregate gross tonnage of about 10,400 tons. The Harlan & Hollingsworth Corporation, Wilmington, Del., aside from completing several merchant vessels, delivered 24 boilers, aggregating 10,729 hp.

The navy yards at New York and Mare Island, the only two Government yards equipped for shipbuilding, have a greater volume of work in progress and authorized than ever before in the history of the new navy. The battleships *New York* and *No. 39*, two river gunboats and two fuel ships, are under construction at the New York yard, and a collier has just been completed.

TONNAGE NEXT TO LARGEST IN THE WORLD

It is pointed out by International Marine Engineering that few persons realize that the American merchant marine in point of tonnage stands next to Great Britain. It has 7,886,518 tons, as compared with Great Britain's 18,696,237 tons and Germany's 5,082,061 tons. Practically all of the American merchant marine, however, is confined to the domestic trade, thereby differing from the others. Recent census reports show that there is invested in United States shipyards practically \$150,000,000 and in them is spent annually about \$100,000,000 for wages and materials.

If to the total of the American merchant marine were added the 2,000,000 or more tons of vessels now in the foreign trade owned by Americans, but operating under the flags of other countries because of the handicap placed upon vessels in such trade when flying the American flag, the total American merchant marine would be increased by this amount, bringing it up to nearly 10,000,000 tons. Furthermore, there would be an increase in the amount of the capital invested in shipping already quoted of about 33 per cent., with corresponding increases in wages, salaries, money spent for repairs, etc., to say nothing of the taxes that would be collected on this tonnage. As some of the vessels in question are in the passenger service and others in the freight service, a unit of \$75 per ton can be safely adopted as a valuation. This would represent \$150,000,000 of American money invested in ships at the present time flying foreign flags, and yet not benefiting the United States Government to the extent of one penny, so far as taxes, etc., are concerned.

The Galion Iron Works & Mfg. Company, Galion, Ohio, which has succeeded the Galion Iron Works Company, has completed its organization by the election of D. C. Boyd, president; F. W. Faber, vice-president, and F. W. Biehl, secretary and treasurer. The new company will have \$500,000 in preferred stock and \$500,000 in common stock. A large addition to the plant is being designed and will probably be started in a few weeks.

The Machinery Markets

Throughout the country the dominant note in the machinery markets is one of hopefulness. Despite the fact that present conditions are quiet, there is a feeling in nearly every center that demand will slowly awaken and that at least a fair business may be expected before many weeks are past. In New York optimism is general. Inquiry is a trifle better in Philadelphia and the feeling more confident. In New England better business is not an actuality, but the tone is more cheerful. In Cleveland a moderate volume of orders has been received and a gradual picking up of business is looked for. Cincinnati expects domestic demand to improve more quickly than export business and the trade is more cheerful despite there being little in sight at the moment. In Chicago some railroad inquiry has come out, though on the whole conditions are quiet. Milwaukee points out that much depends in the future on the adjustment of national questions which affect business. In the Central South there is greater cheerfulness, although buying is still at a minimum. St. Louis has felt an increase in inquiries and is more hopeful. Texas has experienced little improvement, though it has in sight a good demand for road building machinery. The Pacific coast continues quiet, but dealers believe that there is considerable activity in store for them in the course of two or three months. In the Pacific Northwest business is a shade heavier and January is expected to bring satisfactory activity.

New York

NEW YORK, January 7, 1914.

There has been no increase in demand upon local machinery dealers, but the better feeling generated in the closing days of 1913 is noticeable in every direction and this of itself will help bring the improvement which is expected to come along slowly in the course of a few weeks. In the discussions of public questions which have an influence on business, the one commented on with the greatest satisfaction is that the attitude of the administration toward big business enterprises has been more clearly defined, as a result of which a greater degree of harmony between the two is apparent. Conferences of salesmen around the holidays served to bring out that manufacturing facilities can be greatly improved, in fact that actual needs exist and the problem is to develop these requirements into orders. The situation in this direction is one inspiring hope.

The Hatheway Mfg. Company, Bridgeport, Conn., manufacturer of sheet metal and wire goods, is planning to start a branch factory in Hoboken, N. J., and will be in the market for power press equipment, single and double action.

The Ticonderoga Machine Works, Ticonderoga, N. Y., is in the market for a machine or instrument to attach to a lathe by means of which the running balance of a roll or shaft may be found, in other words, a machine that will enable them to accurately balance a roll while running at its proper speed.

The American-Krupp-System-Diesel Engine Company, 165 Broadway, New York City, which was incorporated last fall with a capital stock of \$10,000,000, is seeking a site for a factory. Preference will be given to a city between New York and Norfolk, Va., on the Atlantic seaboard. Louis H. Dos Passos, John R. Dos Passos and Charles H. Starbuck, president of the New York Air Brake Company, are interested. John L. Bogert is the engineer. Officers have as yet not been chosen.

The Fibre & Steel Container Company, Albany, has been incorporated with a capital stock of \$500,000 and will establish a manufacturing plant. M. J. McMullen, T. Tracy and George Costigan, 2 Columbus Circle, Albany, are the incorporators.

The J. Edward Ogden Company, Bayonne, N. J., is erecting a \$25,000 addition to its plant, which is devoted to the fabrication of pier doors, wharf apparatus and ferry machinery, and to the manufacture of expansion bolts, the Star Expansion Bolt Company being a subsidiary.

Waterworks will be constructed at Milltown, N. J., at a cost of \$45,000.

The Superior Machine Company, Sterling, N. Y., has been incorporated with a capital stock of \$35,000 and will establish a plant for the manufacture of washing machines. A. B. and W. A. Cooling and P. W. Dillon are the directors.

The National Brewing Company, Syracuse, N. Y., has plans in progress for the erection and equipment of an addition to its fermenting plant, to cost about \$15,000.

B. J. and J. G. Case, Sodus, N. Y., have completed plans for the erection and equipment of a cold storage plant of 60,000 bbls. capacity, of concrete and steel construction, to cost \$100,000.

The Jamestown Upholstering Company, Jamestown, N. Y., is completing the construction of a large factory building, which is the second of a group of brick and concrete structures planned by this company, which was organized about a year ago.

A machine shop addition 35 x 80 ft. is to be made to the plant of the Jamestown Garage Company at Cherry and West Second streets, Jamestown, N. Y.

The E. U. Scoville Company, Manlius, N. Y., whose foundry was recently damaged by fire, advises that no new construction will be necessary at this time, and that operations will proceed without the addition of any new machinery before April 1, the buildings being only partially destroyed.

The main building of the Curtiss Brothers canning factory, Batavia, N. Y., is being enlarged by the addition of a third story 48 x 48 ft., which will be equipped for canning peas. A fireproof warehouse 85 x 100 ft. is also being erected by the company.

The Falconer Mirror Company, Jamestown, N. Y., has leased for 10 years the factory of the Gem Mirror Company at Youngsville, Pa., and will install additional equipment for its operation.

The Haberle Brewing Company, Syracuse, is receiving bids for addition to its brewing plant.

A three-story and basement cold storage building of stone construction and fireproof is to be erected at Lockport, N. Y., by Crutchfield & Woolfolk, commission merchants, Pittsburgh, Pa. This building will be opposite the company's present cold storage plant at Hawley and Caledonia streets.

The mill of the Madigan Lumber Company, Park avenue, Dunkirk, N. Y., recently damaged by fire, is undergoing extensive improvement. A fireproof addition, 60 x 82 ft., and a fireproof boiler house are being built. New equipment will be installed, doubling the capacity of the plant.

The Simonds Mfg. Company has acquired additional land near its steel plant at Lockport, N. Y., upon which it will erect factory buildings.

Plans are being prepared by the Rumsey Company, Ltd., manufacturer of pumps, etc., Seneca Falls, N. Y., for an additional factory building upon a site recently purchased.

The New Process Gear Company, Syracuse, has let the contract for the erection of a case-hardening building, 40 x 40 ft., of structural steel, brick and concrete.

The Rochester Warehouse Company, Rochester, N. Y., is building a 7-story and basement warehouse, 70 x 370 ft., for which considerable freight handling and elevating machinery will be required.

The Peerless Belting Company, Buffalo, which recently increased its capital stock from \$15,000 to \$150,000, is having plans prepared for the enlargement of its plant. Considerable new machinery and equipment will be installed. Timothy Gingras is president.

The Niagara Textile Company, Buffalo, N. Y., will add a second story to its large plant on Transit street in the spring.

The International Brewing Company, Buffalo, is building a structural steel and brick addition to its brew house.

Bids will be called for in January or February for a factory power house and dry kiln buildings, 42 x 256 ft., three stories of concrete brick and steel, to be erected by the Quaint Art Furniture Company on West Manlius street, East Syracuse. Charles L. Litchison, 1809 Park street, Syracuse, is president.

New England

BOSTON, MASS., January 6, 1914.

The holiday season has ended with a better all-around feeling as to the future. Actual results have not yet materialized, nor were they expected at so early a date. The situation seems to clarify—the baffling complexities of the great economic questions, the tariff, the currency and the large corporations are removing themselves. The next two months will be watched with the most careful scrutiny.

Bids will be received until January 15 by the commissioner of public works, Boston, Mass., for a pumping plant for high pressure work.

The Shoe Hardware Company, Waterbury, Conn., has increased its capital stock from \$25,000 to \$400,000.

Announcement is made that the factory of the Roger Williams Silver Company, Providence, R. I., will be removed to Mount Vernon, N. Y., where a factory is in process of erection. About 150 people are employed in the business.

Additions to general manufacturing facilities in New England include the following: Bennington Scale Company, Bennington, Vt., new factory; Levisseur & Conway, Lynn, Mass., leather manufacturers, addition to cost \$8000; T. D. Barry Company, Brockton, Mass., administration building and additional wing to factory; Warner Bros. Company, Bridgeport, Conn., addition to be erected in the spring; Wilkinson Counter Company, Salem, Mass., new factory; Jenkins-Phipps Company, Wakefield, Mass., furniture factory, building to cost \$15,000; W. L. Douglas Shoe Company, Brockton, Mass., addition to shoe factory.

David R. Jones, Merrimack, Mass., will rebuild his table factory, recently destroyed by fire.

Philadelphia

PHILADELPHIA, PA., January 5, 1914.

A trifle better inquiry for various classes of tools has developed and some of the machine tool merchants are more encouraged. The demand is confined largely to single tools for replacement purposes, however, very little in the way of new propositions coming forward. The Pennsylvania Railroad has inquiries out for some eight or ten tools to be distributed among its various shops. There has been a slightly better demand for power equipment, although the outlook is not considered very encouraging. Second-hand machinery is in light demand. A better general demand for tools and machinery is looked for later in the month after the completion of inventories.

Local contractors have been estimating on the erection of a group of manufacturing buildings, comprising a main factory building, two warehouses, a storage room and a power house, to be erected at Wolf and Swanson streets, this city, for Harshaw, Fuller & Goodwin, Cincinnati, Ohio, from plans by J. R. Silsbee, Elyria, Ohio. Details are not available.

The D. B. Martin Company will make extensive additions to its boiler house at Thirty-fifth street and Grays Ferry avenue. The contract for the building has been awarded.

Matzinger & Potter, engineers, are planning a two-story brick and concrete building, 40 x 45 ft., to be erected and equipped for a garage and laundry building, at 1431 South Fifth street for the Mt. Sinai Hospital.

The Pennsylvania Railroad is asking bids on a number of tools to be supplied shops on its various divisions. The list includes lathes, shapers, drill presses, pipe machines and special presses.

The New York Piano Stool & Mfg. Company, Stroudsburg, Pa., has been incorporated with \$10,000 capital stock, to manufacture piano stools, benches, piano frames, etc. H. A. Scherman is president and general manager; H. B. Drake, vice-president; C. G. Booth, secretary and treasurer. The company has taken over a plant formerly located at Washington, N. J., and has moved into a new building at East Stroudsburg.

The Harrisburg Hydraulic Machinery Company, 36-38 North Third street, Harrisburg, Pa., has been incorporated with a capital stock of \$20,000 to take over the hydraulic ram business formerly conducted by Charles H. Drawbaugh & Co. S. R. Satterthwaite is president; J. T. Olmsted, vice-president; I. P. Bowman, secretary, and L. D. Perry, treasurer. The present plant will be operated and no extension will be made at the present time.

It is reported that the Merchants' Ice Company, Easton, Pa., is ready for bids on the construction of an ice plant to be erected on Dock street, in that city. Information may be obtained from George B. Sherry, Easton, Pa.

The Morris County Traction Company, Morristown, N. J., is reported to be contemplating the erection of a \$250,000 power plant at that place, for which O. G. Schultz, Morristown, N. J., is preparing plans.

Chicago

CHICAGO, ILL., January 5, 1914.

The market for machine tools at Chicago still lacks any very tangible encouragement in the way of prospective purchases of machinery on a substantial scale. The past week brought out some new railroad inquiry and the proposed purchases of the Lake Shore & Michigan Southern Railway for both main line and branch road terminals are still to be placed. Among industrial plant inquiry are the requirements of the Loew-Victor Engine Company, which is equipping a plant in Chicago for the exclusive manufacture of marine engines. Other inquiry is limited and sales are light.

The F. C. Damm Company, 115 Wabash avenue, Chicago, has been incorporated with a capital of \$10,000 to manufacture and repair linotype machines. The company was organized by F. C. Damm.

The Chicago Title & Trust Company, Chicago, has taken title for what is known as the Carey tract at Forty-seventh and Robey streets, a site of about 30 acres. It is reported that a large manufacturing operation will be located there.

The American Coconut Butter Company has taken out a permit through W. D. Cowles, architect, Chicago, providing for the erection of a factory at 2505 West Eighteenth street, to cost \$50,000.

A. H. Anderson, 1215 Fulton street, Chicago, whose plans for a brass foundry, 25 x 120 ft., one and two story, were recently announced, advises that he will add to the equipment when it is ready.

The Irving Park Sash Door Company, Chicago, are to build a two-story brick factory, 69 x 96 ft., at 4250 North Crawford avenue, at a cost of \$8000.

The Ravenswood Ice Company, Chicago, has had plans completed for a one-story ice manufacturing plant to be built in Ravenswood. It will be 52 x 84 ft. and will cost about \$10,000.

The Stegeman Motor Truck Company, Chicago, has been organized for the purpose of manufacturing, assembling and dealing in motor vehicles. The company has been incorporated with a capital of \$10,000 by D. H. Burkland, 1444 Catalpa avenue; R. C. Flodin and E. E. Burkland.

The Massey Vise Company, 552 West Harrison street, has taken out incorporation papers providing for a capital of \$10,000. The company manufactures vises, hardware and small tools.

The Union Wrapping Machine Company, Joliet, Ill., has been incorporated with a capital stock of \$17,600 by Frank Streich, Paul Franke and Fred E. Kemp to engage in manufacturing a special device.

The Mathersville Light & Power Company, Mathersville, Ill., has been incorporated with a capital stock of \$50,000 and will equip an electric plant.

The Monmouth Public Service Company, Monmouth, Ill., has voted to expend \$100,000 in the extension of its gas and electric light and power plants. Hugo Wurdack, St. Louis, is president.

The Dayton & Ottawa Light & Power Company, Aurora, Ill., has been incorporated with a capital stock of \$100,000 by Fred W. Simpson, De Witt E. Northam and Sidney F. Blanc to equip and operate electric plants.

The Crane Mfg. Company, Galesburg, Ill., has been incorporated with a capital stock of \$15,000 by Fred Peterson, Carl Crane, and others, to engage in a manufacturing business.

The No-Sag Gate Company, Galesburg, Ill., has been incorporated with a capital stock of \$50,000 by Fred Peterson, Carl Crane, and others, to engage in the manufacture of a patented gate.

The Abingdon Artificial Ice Company, Abingdon, Ill., has been incorporated with a capital stock of \$14,000 by J. B. Yoeman, A. Jewell, A. C. Harvey, B. P. Baird and L. H. Robertson to equip an ice plant.

The H. C. Wickwire Company, Rockford, Ill., has been incorporated with a capital stock of \$15,000 to manufacture lumber, millwork, etc.

The Acorn Brass Mfg. Company, Aurora, Ill., recently adjudged insolvent, is expected to be able to readjust its affairs under the receivership of J. C. Ruth in a very short time.

The Dayton Cycle Car Company, Joliet, Ill., organized by W. O. Dayton, of that city, will build a car to sell for \$375, and is now seeking a plant for manufacturing purposes.

The H. E. Wilcox Motor Company, Minneapolis, Minn., has been incorporated with \$3,500,000 capital stock, and has taken over the H. E. Wilcox Motor Car Company, which operates a large plant in Minneapolis. A large amount of new capital will be put into the business and the plant will be materially enlarged. O. P. Briggs, who organized the Twin City Iron Works, and was later president of the National Founders' Association, is president. F. E. Kenaston, president of the Minneapolis Threshing Machine Company; M. J. Scanlon, of the Brooks-Scanlon Lumber Company; G. W. Lewis, of the Wilcox Bros. Lumber Company, and other prominent men are interested.

The Town Council of Farnhamville, Ia., will receive bids for the material and construction of an electric light and power plant. Bids received until January 19.

The Oliphant Water Motor Company, Burlington, Iowa, has been organized with a capital stock of \$415,000. The company will manufacture water motors and washing machines. The company was incorporated by Alfred Oliphant, president; Harry J. Criner, vice-president, and L. A. Raaz, secretary.

The Sioux City Gas & Electric Company, Sioux City, Iowa, will spend \$100,000 in the extensions of its equipment and increases in capacity.

Bids will be received by Bruce & Standeven, engineers, Omaha, Neb., until February 1, for a waterworks system for Mead, Neb.

The Nelson Mfg. & Supply Company, Hutchinson, Kan., is erecting a tank shop in connection with a brass foundry instead of a pipe and fitting shop, as recently reported.

Morrill, Neb., has voted a \$15,000 bond issue for the construction of waterworks.

Alterations and improvements, costing approximately \$23,000, will be made to the brewery of the American Brewing Company, Great Falls, Mont. Considerable new machinery will be installed. Lease & Richards, of Great Falls, are the contractors in charge.

William J. Mielke, Hartford, S. D., will manufac-

ture tractor engines in a building to be equipped for the purpose.

The Utilities Company will build and install a light, power and waterworks plant with a heating station at Devils Lake, N. D. F. E. Corson, Fargo, N. D., is president.

Milwaukee

MILWAUKEE, WIS., January 5, 1914.

The situation is well summed up by Otto H. Falk, president Allis-Chalmers Mfg. Company, vice-president of the Falk Company, and president of the Milwaukee Metal Trades & Founders' Association, who says: "While metal trades business in the Milwaukee district for 1913 showed an average increase of approximately 15 per cent. over 1912, the outlook for the immediate future is not so encouraging as one year ago, and the business in this line during 1914 will to a large extent depend upon those conditions which will generally control the business situation throughout the entire country." The definite summary of 1913 business in the Milwaukee district, now available, shows a total production of iron, steel and heavy machinery to the value of \$46,519,509. The metal trade maintains its lead as the ranking industry of Milwaukee. Eighty shops, employing 19,503 men, were operated in the Milwaukee district the past year.

The Steam Appliance Company, Milwaukee, has taken occupancy of its new shop and office building on Sixty-third avenue, near Burnham street, in West Allis. The company is employing about 50 skilled workmen in the manufacture of oil and steam separators, exhaust heads, steam traps, flue cleaners and grate bars.

The Bradley & Metcalf Company, Milwaukee, manufacturer of boots and shoes, has purchased a large factory site at Eighth and State streets, Milwaukee, and will during the present year build a new factory costing in the neighborhood of \$125,000.

Bids will be received until January 15 by L. J. Widule, county clerk, Milwaukee, Wis., for installation of an electric light and power system at Wauwatosa.

The National Brake & Electric Company, Milwaukee, having completed work on its new gray-iron foundry, is rushing work on the large addition to its open-hearth foundry, started some time ago. The gray-iron shop is making from 30 to 40 tons of light castings daily. To handle the jobbing work the officers of the company have organized the National Steel Foundries Company with a capital stock of \$5000. R. P. Tell, W. K. Boyle and P. H. Breed are the incorporators. Mr. Tell is vice-president and general manager of the National Brake & Electric Company and Mr. Boyle is secretary and treasurer.

The Fancher Nut-Lock Company, Abbotsford, Wis., has been organized with \$25,000 capital stock to manufacture devices for securing nuts designed by A. A. Fancher, with whom are associated Paul Benzmann, R. Prentice, George Black and M. Ellingson. Plans for manufacturing are being made.

The Kenosha Structural Iron & Boiler Works, Kenosha, Wis., will devote considerable attention to the production of a new type of expansion joint for concrete highway and street construction, designed by P. H. Kluender, president. A small list of machinery is being purchased.

The Rapid Washing Machine Company, Grand Rapids, Wis., has been organized and will incorporate with \$10,000 capital stock to manufacture a new type of revolving bottom and suction plunger washing machine, designed by William Witte, of Ripon, Wis. The Anderson Carriage Works has been leased. Gustav Kaye is superintendent. James Hamilton is in general charge.

The West Allis Iron Works, Seventy-fifth avenue and Elm street, West Allis, a suburb of Milwaukee, has reorganized by electing Peter Hott president and general manager; Peter Scouten, vice-president, and A. C. Hunt, secretary and treasurer. The company established a foundry about 14 months ago and is producing gray-iron and semi-steel castings and dies.

The A. Gettelman Brewing Company, Milwaukee, has increased its capital from \$80,000 to \$560,000, and will greatly increase the size of its brewing, bottling and malting plant. Frederick Gettelman is general superintendent.

A bond issue of \$100,000 for preliminary work on the proposed municipal lighting plant at Milwaukee is provided in the 1914 budget. Fred G. Simmons is commissioner of public works.

The Capital Fence Company, Madison, Wis., whose plans to manufacture wire fence were recently noted, will buy a spot welder. Address A. W. Wellman.

The J. I. Case Threshing Machine Company, Racine, Wis., has taken partial occupancy of its new Lakeside or South works in Racine and plans to have it in full operation in the first quarter. The shops were erected at a cost of \$1,500,000 and have been 16 months in construction.

Articles of incorporation have been filed by the Racine Pattern Works, Racine, Wis., established several months ago as a partnership between J. C. Hamata and Wenzel J. Simanek. The capital stock is \$10,000. The business is rapidly growing and plans for enlargement are under way.

The Reiss Coal Company, Sheboygan, Wis., has awarded the contract for improving and rebuilding its coal dock at the Head-of-the-Lakes, known as St. Louis Bay Dock No. 1, to the Heyl-Patterson Company, Pittsburgh, at \$125,000. Work will commence April 1 on a new unloading bridge and transformer house and a 600-ft. extension. The rebuilt dock will have a capacity of 250,000 tons and will be 1800 ft. long.

The Manitowoc Malting Company, Manitowoc, Wis., has increased its capital stock from \$500,000 to \$750,000, and plans important improvements.

Behemer & Sons, foundrymen, Mayville, and Charles Feucht, an expert machinery designer of Eau Claire, are negotiating for a site for a machine shop and foundry plant at Ladysmith, Wis. A decision will be made before the close of January. The firm is at present making plows, feed cutters, corn shellers and castings for the custom trade.

The Great Northern Pail Company, Green Bay, Wis., whose factory recently burned, will rebuild and install four lathes. Candy pails are the principal product. The company plans to be operating again in May. D. F. Smith, formerly one of the two principal stockholders, will retire from the company.

Articles of incorporation have been filed by the Hartland Mfg. Company, Hartland, Wis. The capital stock is \$20,000 and T. A. Bakken, W. B. H. Kerr and John H. Krause are the incorporators. The company will manufacture implements.

The Minahan Electric Company has been organized with \$5000 capital stock by the Minahan interests at Green Bay, Wis., to operate a commercial power and lighting plant in connection with the Minahan Building. John R., Eben R. and Victor Minahan are the owners.

The New London Iron & Foundry Works, New London, Wis., which was taken over by John Herres, October 1, will be enlarged by the erection of an addition to the casting shop, 40 x 70 ft., of brick construction. It will be ready about March 1.

The Northern Casket Company, Fond du Lac, Wis., will erect a 60 x 120-ft. addition, to be devoted to glue-joining by automatic machinery.

The Oconto Company and the Holt Lumber Company, Oconto, Wis., are rebuilding their sawmills and will replace all the machinery and saws with new equipment.

The Kimberly-Clark Company, paper and pulp manufacturer, Neenah, Wis., has increased its capital stock from \$2,000,000 to \$3,000,000. The company's mills are already among the largest in the world, but extensions and additions to the equipment will be made during the coming year.

The Riverside Paper & Fibre Company, Appleton, Wis., which operates a large fiber mill near Kaukauna, Wis., is making surveys for the establishment of a large paper mill in conjunction with the present works. The improvement will cost from \$250,000 to \$450,000. Stephen W. Murphy is secretary and general manager.

Whitney Bros., marine contractors, Superior, Wis.,

have started work on a new machine shop, dock and office building at First street. The machine shop will be 60 x 120 ft., three stories, of concrete and brick, and the dock will be 600 ft. long, of concrete. New machinery and tools will be purchased.

Indianapolis

INDIANAPOLIS, IND., January 5, 1914.

The Indiana Veneer Company will rebuild the plant in this city recently destroyed by fire with a loss of \$100,000. There was practically no salvage on machinery. Clarence L. Goodwin is president of the company.

The Brookside Lumber Company's mill in this city burned December 30 with a loss of \$5000 on machinery. James H. Galloway is president of the company.

The Coppes, Zook & Mutschler Company, Nappanee, Ind., with \$400,000 capital stock, has been dissolved. Frank Coppes, John D. Coppes and Harold E. Zook taking over the flour and sawmill and Albert and Charles Mutschler the table factory.

The Engineering Company, Ft. Wayne, Ind., has increased its capital stock from \$15,000 to \$100,000.

The Huntington Specialty Company, Huntington, Ind., has been incorporated with \$10,000 capital stock, to manufacture novelties. H. W. Hicks, J. R. Emley and J. W. Caswell are the directors.

The new plant of the Auburn Post Card Company, Auburn, Ind., was burned December 27 with \$50,000 loss and insurance of \$43,000.

The Elkhart Hydraulic Company, the Elkhart Power Company and the St. Joseph Hydraulic Company have been absorbed by the Indiana-Michigan Electric Company, South Bend, Ind., which will now control water power sites along the St. Joseph River at South Bend, Mishawaka, Elkhart and Goshen, Ind., and Niles, Buchanan, Berrien Springs and Benton Harbor, Mich.

The Stearns Curtain Stretcher Company, Mishawaka, Ind., has been incorporated with \$25,000 capital stock to manufacture curtain stretchers. Waldo B. Stearns, James Hennessy and Fred E. Keiser are the directors.

Detroit

DETROIT, MICH., January 5, 1914.

The local machinery market continues quiet, but now that the holiday season is past some improvement is looked for. A great many industrial concerns hold their annual meetings in January and plans for extensions and improvements are passed on at this time, so that the month is usually prolific of considerable new business. A few new inquiries are before the trade, but these are reported to be mainly for replacement purposes. Sales have been limited to single tools, so far as reported. Manufacturing operations are being conducted on an even basis and there seems to be no sign of a further reduction in working forces or hours. Power plant machinery is in light demand, as is also electrical equipment. Makers of both steel and gray-iron castings report business rather unsatisfactory, with few new orders coming in. Little new construction work is reported by contractors.

The Detroit Manufacturers' Supply Company, Detroit, has completed plans for the erection of a two-story plant 90 x 110 ft. of reinforced concrete construction.

The American Laundry Company, Detroit, will erect a one-story brick laundry to cost \$7500.

The Steel King Plow Company, Detroit, has been incorporated with \$100,000 capital stock to manufacture traction plows. Edwin S. George, Stanford W. Crapo and Samuel Mulford are among the incorporators. The new company has secured a factory at Lieb and Larned streets.

The Victor Knitting Mills, Detroit, has been incorporated with \$25,000 capital stock to manufacture knit goods, by David R. Stocker, Edwin A. Wolf and R. F. Wolf.

It is reported from Jackson, Mich., that the Briscoe Motor Car Company, of which Benjamin Briscoe, for-

merly president of the United States Motor Company, is the head, has completed arrangements for the erection of a large motor car assembly plant in that city.

The plant of the United States Brass & Iron Foundry Company, Flint, Mich., was damaged by fire to the extent of \$30,000 on December 27. Information as to the plans of the company toward rebuilding is not available.

The Fenton Engineering Company, Fenton, Mich., has been organized with \$100,000 capital stock to manufacture cyclecars. The factory will be located at Fenton.

Emery E. Turner and Carl Floran, Grand Lodge, Mich., will establish a machine shop and automobile repair shop.

The factory of Kompass & Stoll, Niles, Mich., will be enlarged by the erection of an addition 60 x 150 ft., which will be used for the manufacture of kitchen cabinets.

The Harris Broom Company, Chicago, has completed negotiations for removing its business to Muskegon, Mich., where a large two-story plant has been secured. The building will be entirely remodeled and new machinery installed.

The Fremont Stove Company, Wyandotte, Mich., has placed the contract for a three-story addition to its plant.

The sawmill of the East Jordan Lumber Company at East Jordan, Mich., which was recently destroyed by fire, will be rebuilt on a larger scale.

The Wolverine Screw Company, Detroit, has filed a voluntary petition in bankruptcy and Clare L. Christie has been appointed receiver.

The State of Michigan will erect a large feed mill at the Jackson prison, Jackson, Mich. Modern milling machinery will be required.

Cincinnati

CINCINNATI, OHIO, January 5, 1914

Although local machine tool builders have little definite business in sight, there is a somewhat better feeling as to the future. No great revival is anticipated in the export trade in the near future, but domestic business is expected to improve at an early date. Both skilled and common labor is plentiful, and with many manufacturers it is a serious problem to find enough work to keep their best skilled workmen employed. Some improvement is shown in the demand for both electrical equipment and woodworking machinery. The jobbing foundries making a specialty of machine tool castings are not very busy. Reports from both Dayton and Hamilton are to the effect that the same conditions exist in those manufacturing centers.

Local machine tool builders have received a list of about 20 machines from the Geary Street Railway Company, San Francisco, Cal. The list is made up of a number of lathes, ranging in size from 14 to 48 in. Several shaping and radial drilling machines are also included.

It is currently reported that the Boston & Maine Railroad Company has recently bought a number of tools in this market for early delivery. The orders were said to have been placed through agents in other cities.

The Neil & Smith Electric Tool Company, Cincinnati, is a new incorporation with \$30,000 capital stock. The incorporators are John W. Neil, Edward F. Smith, R. K. LeBlond, C. M. Bigger and James G. Neil. The new company has acquired the plant of the Smith Electrical Tool Company on East Sixth street and intends adding to its manufacturing facilities some time during the next few months.

Nicholas P. Smith & Co., Cincinnati, real estate brokers, announce that the Firestone Tire & Rubber Company has leased a five-story building on East Eighth street that will be fitted up at an early date mostly for warehouse purposes. A vulcanizing plant will probably be installed.

The Reliable Safe & Lock Company, Covington, Ky., is moving into its new plant, which it expects to have in operation within the next few weeks.

The Cincinnati Pulley Machinery Company has moved into its new plant at Third and Scott streets,

Covington, Ky. The company's plant was destroyed by fire several months ago. No additional equipment will be required.

The North Dayton Machine & Tool Company, Dayton, Ohio, has been incorporated with \$5000 capital stock to operate a general machine shop. H. O. Norris is one of the principal incorporators.

The Washington Mfg. Company, Washington Courthouse, Ohio, will make an addition to its chair factory at that point. Very little equipment will be required as the new building will be used principally for storage purposes.

Bids will be received until January 10 by E. R. Haines, village clerk, New Bremen, Ohio, for a motor-driven pump.

The National Mortising Machine Company, Springfield, Ohio, has been incorporated with \$10,000 capital stock to manufacture mortising machines. The incorporators are G. W. Campbell, C. H. Lammert, J. J. Hartman and A. V. Overhoker.

The American Concentrator Company, Springfield, Ohio, has been incorporated with \$100,000 capital stock by F. E. Butcher, H. W. Fullerton and others. The company will manufacture special mining and agricultural equipment.

The Superior Gas Engine Company, Springfield, Ohio, has tentative plans under way for an extensive addition to its plant. Building details are not yet available.

The municipality of Westerville, Ohio, will open bids at an early date for a number of electric transformers. F. F. Kidwell is clerk of the board of public affairs.

The Kramer Brothers' Company, Dayton, Ohio, has commenced construction on an addition to its plant. Only a limited lot of equipment will be required.

The Indiana Fibre Products Company, Marion, Ind., has been incorporated with \$50,000 capital stock and will equip a factory for the manufacture of corrugated paper boxes and paper novelties. Considerable special machinery equipment will be required.

The Nicholson-Kendle Furniture Company, Huntington, W. Va., will make an extensive addition to its factory. A sprinkler system is included in the list of equipment required.

Cleveland

CLEVELAND, OHIO, January 5, 1914.

Business in machine tool lines is not as dull as was expected during the holidays and a few days following. A moderate volume of orders in single tools has come out and the market shows more life than it did a month ago. Inquiry for second-hand machinery is fairly good. Some manufacturing plants report an improvement in the volume of orders and the general sentiment has improved materially. While an early return to normal conditions is not looked for the feeling prevails that business in machine tool lines as well as in general manufacturing lines will gradually pick up. Conditions continue quiet in the foundry trade.

The Lake Erie Nail Company, Cleveland, has been incorporated with a capital stock of \$1000 by B. A. Gage, Charles S. Wachner, and others.

The Thatcher-Rueter Mfg. Company, 826 Champlain avenue, Cleveland, Ohio, manufacturer of dies and tools, has been declared bankrupt, following a voluntary petition in bankruptcy filed in the Federal Court in Cleveland a few days ago. The company places its liabilities at \$14,033, and its assets at \$26,119.

The Refrigerating Machine Company, Toledo, Ohio, has been incorporated with a capital stock of \$25,000 by G. Runkel, M. E. Rowe, H. C. Adams, W. K. Hayner and E. Kirkendal.

The Michigan Central Railroad has purchased a 10-acre site adjoining its yards in North Toledo, Ohio, on which it is reported car shops for heavy repair work may be built.

The Shenango & Mahoning Railway Company, Youngstown, Ohio, contemplates the expenditure of \$250,000 for enlarging its Lowellville power plant, the capacity of which will be increased from 25,000 to

35,000 hp. Contracts for the required equipment will be placed shortly.

It is stated that the American Stamping & Enameling Company will begin the erection of its new plant in Massillon, Ohio, this month. The company will move from Bellaire, Ohio, where its plant is at present located.

The Bay View Foundry Company, Sandusky, Ohio, has had plans prepared by the Osborn Engineering Company, Cleveland, for a new foundry building for the manufacture of cylinder castings. It is expected that the contract will be placed shortly.

The Craftsman Tool Company, Ashtabula, Ohio, has been incorporated with a capital stock of \$30,000 by F. D. Sawdey, J. W. Beardslee, H. Leavitt, A. W. Felton and Fred L. Horton.

Wheeling

WHEELING, W. VA., January 5, 1914.

Ground has been staked off for a new addition to the plant of the Wheeling Metal & Mfg. Company, Glendale, W. Va. The building will be occupied as a press room in the manufacture of galvanized shingles.

The Modern Electric & Plumbing Company, Charleston, W. Va., will increase its capital stock to \$10,000 and make improvements.

The drum house of the Borderland Coal Company, Bluefield, W. Va., has been burned, all tools, electric motors and other equipment being destroyed. The building was 38 x 78 ft. and housed machine tools, pump motors, hoisting drums, etc.

Montgomery, Clothier & Tyler, of Philadelphia, Pa., have installed a power plant at Sharpless, W. Va., costing \$75,000, for the Spruce Fork Coal Company. The machinery contract was filled by the Miller Supply Company, Huntington, W. Va.

The Montpelier Lumber Company, Clarksburg, W. Va., has been organized and will build a plant and operate planing mills. C. E. Prunty is president.

The Central South

LOUISVILLE, KY., January 5, 1914.

The advent of the new year has resulted in an increase in cheerfulness on the part of machinery men, who, in spite of the fact that actual buying is still at a minimum, are confidently predicting better times. More numerous inquiries are being received and prospects in a number of lines are reported better. Ice machinery has picked up especially well, though the boiler trade remains quiet. There is a fair call for electrical machinery, however, especially for equipping lighting plants in small towns. As it is generally believed that the new currency bill will make for easier money, an acceleration of machinery buying is expected.

Buckley Bros., milling machinery dealers, have moved their offices from the Keller Building to the Starks Building.

The Swiss Cleaners & Dyers, Louisville, will erect a new plant early in 1914. A 100-hp. boiler and a 50-hp. engine will be needed, it is expected. Dr. H. E. Mechling is manager.

The Empire Cleaning Works, 813 East Market street, Louisville, is planning the establishment of a new plant, for which power machinery will be needed. Arthur Mattingly is manager.

The Washburn-Crosby Milling Company, Louisville, will add some special equipment to its mill. Frank N. Lund, Jr., is manager of the company.

The Merchants' Ice & Cold Storage Company, Louisville, is building an addition to its plant at Seventh street and Magnolia avenue at a cost of \$10,000. Address N. A. Hardin, general manager, for details.

The American Stone Company, 606 Underhill street, Louisville, is in the market for crushing, stone-cutting and other special equipment for manufacturing polishing stone. The power equipment has been purchased. Charles H. Wolke is manager.

An electric light plant will be installed at Horse Cave, Ky., by P. T. Vaughn and J. T. Morton, including

engine, boiler, generator, etc., the last named to be 250 kw.

The Lexington Woodenware Company, Lexington, Ky., has increased its capital stock from \$25,000 to \$50,000 and will increase its equipment.

S. W. Easley, Williamsburg, Ky., is planning the establishment of an ice factory at London, Ky. A plant with a capacity of 10 tons a day will be installed.

The Kentucky Utilities Company, Lexington, Ky., has purchased an electric light plant at Harlan, Ky., and will enlarge it considerably. It is probable that it will be used as a central power plant for the service of coal mines in that immediate vicinity.

The butchers of Maysville, Ky., are planning the installation of a central abattoir, the equipment of which would require refrigerating and other machinery. Staker Bros., whose slaughter-house was recently burned, are interested in the plan.

Announcement has been made by the city of Taylorsville, Ky., which recently decided to issue waterworks bonds, that bids on the construction of a complete plant will be received until February 7. J. H. Reid is mayor.

The Dawson Light & Power Company, Dawson Springs, Ky., which was recently incorporated, has taken over the electric department of the Dawson Milling Company and will increase the capacity of the plant from 60 to 100 kw. The type of current will probably be changed from direct to alternating. E. A. Stevens is manager.

Experts employed by the City Commission of Newport, Ky., to report on the water plant have recommended the purchase of equipment costing \$78,000. The equipment the purchase of which is recommended includes a vertical, triple-expansion, high-duty pumping engine of 5,000,000-gal. daily capacity, as well as new boilers and accessories.

Mt. Olivet, Ky., is planning the installation of an electric light plant, it is reported. The proposed expenditure is \$5000. Address the mayor.

Dr. J. W. Pryor, Lexington, Ky., is reported to have plans for a large clay manufacturing plant near Paducah, Ky. He is said to be representing Eastern capital.

The Morton's Gap Ice Company, Morton's Gap, Ky., has been organized and will require an ice machine with a capacity of 16 tons a day.

The Anglo-American Mill Company, Owensboro, Ky., builder of flour mills, reports that it will erect an addition 60 x 300 ft., and will purchase equipment in the immediate future. The new building will have reinforced concrete foundations and floors, and corrugated iron sides. L. Freeman Little is president of the company.

R. L. Moore and others, Marion, Ky., have purchased the plant of the Marion Ice & Cold Storage Company. They will incorporate a company with \$15,000 capital stock and will double the capacity of the plant at once.

A franchise for the operation of waterworks at Harlan, Ky., has been purchased and a plant will be installed at once. The cost will be about \$30,000. Address the Harlan Water Company.

The Williamsburg Water Works Company, Williamsburg, Ky., has completed plans for the expenditure of about \$25,000 on a waterworks plant.

The Dayberry Steam Laundry Company, Corbin, Ky., has been incorporated with a capital stock of \$13,000 by P. Weesner, Charles H. Keeton and J. E. Dayberry, and will install equipment to cost about \$5500 at once.

The Bowling Green Electric, Water & Power Company, Bowling Green, Ky., is in the market for equipment, to cost about \$70,000.

The Franklin County Creamery Association, Winchester, Tenn., will equip an ice and cold storage plant at once.

The city of Lewisburg, Tenn., has plans for the addition of equipment to its waterworks system.

The McNeal Monument Company, Columbia, Tenn., will purchase a 25-hp. oil engine.

The Clay Mfg. Company, Hickory, N. C., is asking prices on woodworking machinery, including a surfacer, matcher, sawmill, etc. A 50-hp. boiler and engine are required also.

The Chattanooga Armature Works, Chattanooga, Tenn., is planning the construction of a new plant. Among the items of equipment to be purchased are two traveling cranes, the larger of five tons capacity.

The Crystal Ice & Storage Company, Etowah, Tenn., reports that electric power will be used in the operation of its proposed ice factory and cold storage plant.

J. P. Parker, Ooltewah, Tenn., is in the market for crushing machinery to be used in handling limestone.

Graham & Seale, Lebanon, Tenn., will need machine tools for the equipment of an automobile repair shop. A building to be used for garage and repair purposes is now being completed.

The Pittsburg Power Company, Pittsburg, Tenn., has been incorporated with \$15,000 capital stock by A. Rex Flinn, L. D. Gasteiger, Dayton Hunter, and others.

The Cumberland Foundry & Mfg. Company, Nashville, Tenn., has established a machine shop in connection with its foundry. A nickeling plant, brass and aluminum foundry and other departments have also been equipped.

The Johnson-Trustin Lumber Company, Memphis, Tenn., has been incorporated with a capital stock of \$15,000 by Clyde Johnson, W. Youtsey and Robert E. Kreimer, and will equip a mill.

The Bluff City Mills, Bluff City, Tenn., have been incorporated with a capital stock of \$20,000 by J. P. and C. E. Worley and B. P. Allen, and will equip a flour mill.

The Thread Mills Company, Spray, N. C., is reported to be planning the installation of a central power plant to furnish current for power to textile plants in that section.

J. E. Ewing, M. J. Harris, and others, Albemarle, N. C., are organizing a company for the operation of an ice factory and flour mill.

St. Louis

ST. LOUIS, Mo., January 5, 1914.

Machine tool dealers are inclined to look more cheerfully upon the situation. With the currency troubles and inventories out of the way and the winter weather laying a good foundation for spring planting, they are of the opinion that there will be a brightening up of the situation in a material manner within the next few weeks. Inquiries that have been coming, while not of larger individual aggregate, have been greater in number, showing that there is more interest in the future. Industrial operations promise better and both new enterprises and extensions of old ones are being foreshadowed. However, the actual movement of machines has not increased as yet. Second-hand machines are in only light request. Collections are reported satisfactory.

The E. W. Magee Mfg. Company, St. Louis, has increased its capital stock from \$10,000 to \$25,000 for the purpose of extending its manufacturing capacity.

R. D. Smith, formerly with the McKinley Interurban System, and others, of St. Louis, have organized the Seven Cities Company, which will take over existing hydroelectric plants in cities in Arkansas, and construct similar plants in others. The existing plants will be rehabilitated. The plans involve an investment of about \$500,000.

The Landers Lumber & Cement Company, Springfield, Mo., has been incorporated with a capital stock of \$50,000 by D. J. Landers, F. R. McGinness, and C. M. Mitchell, and will install mill equipment.

The board of aldermen of Potosi, Mo., will drill a 1000-ft. well, and is reported in the market for the necessary equipment. H. C. Bell, city clerk, is in charge, with Monie & Dunbar, St. Louis, engineers.

The Gallatin Granite & Marble Works, Gallatin, Mo., has been incorporated with a capital stock of \$16,000 by W. Glenn Smith, Ed. R. Achuff and Charles A. Nixon to equip a stone working plant.

The Baker Mfg. Company, Kansas City, Mo., has been incorporated with a capital stock of \$50,000 by John S. Baker, George E. Talbot and J. H. McConchie to engage in general manufacturing.

H. L. Gilbert and David Miller, Kansas City, Mo., have been accorded a franchise by the city of Hamil-

ton, Mo., to construct and equip an electric light and power plant, electric railway, etc.

The Arkansas Machine & Boiler Works, Stuttgart, Ark., has been organized with W. E. Duckett, president; Thomas F. Ryan, vice-president, and Harvey Tom, secretary-treasurer.

The Union Logging Company, Allport, Ark., has been incorporated with a capital stock of \$15,000 by W. B. Chester, J. B. Reid and G. G. Carnahan, and plans to equip a mill for lumber manufacture.

The Arkansas Hickory Company, Marvell, Ark., has been incorporated with a capital stock of \$15,000 by W. B. and John L. Norton, and will equip a mill.

The E. D. Bedwell Coal Company, Fort Smith, Ark., has been incorporated with a capital stock of \$50,000 by E. D. Bedwell, P. A. Ball and S. H. Abbott to engage in coal mining.

The Merchants' Lighting Company, Little Rock, Ark., has plans for the installation of a boiler of 1200 hp., a 2300-kva. turbine and generator, and a 50-kw. motor generator and other equipment.

The Heber Springs Ice & Storage Company, Heber Springs, Ark., will install a 4-ton compression plant. Carl Spellman is manager.

The Forked Leaf Oak Company, Heber Springs, Ark., has acquired a building and will install equipment for a wagon and implement factory. L. Thompson is president and E. H. Ewing, manager.

W. E. Heflin's cotton gin and grist mill, at Arkadelphia, Ark., is reported burned, with a loss of \$10,000. Replacement plans are under consideration.

The Emancipator Oil & Gas Company, Oklahoma City, Okla., J. M. Reese, manager, is in the market for drilling equipment for its own use.

The city of Valliant, Okla., is receiving bids for construction and equipment of a waterworks plant under a bond issue of \$36,000 recently authorized.

The Ever-Ready Boiler Scraper Company, Thomas, Okla., is in the market for wire-forming machines and other equipment for the manufacture of its specialty device, also lathes, power punches, drills, etc. The company is capitalized at \$100,000. W. J. Omer is president.

The Coffee Bros. Machine Company, Miami, Okla., has been incorporated with a capital stock of \$25,000 by M. D. and E. M. Coffee and J. W. Barnes, and plans to equip for a general machine business.

The Pryor Bottling Works, Pryor, Okla., has been incorporated with a capital stock of \$14,000 by W. T. and S. L. Whittaker, and others, and will equip a bottling plant.

The E. H. Ewing Lumber Company, Warren, Ark., will rebuild its saw mill, recently burned, with a loss of \$10,000 on equipment.

The Eureka Incubator & Furniture Company, Eureka, Ark., recently incorporated, is in the market for planers, shapers, bandsaws and power equipment for immediate installation.

The saw mill and cotton gin of Strong & Haygood at Dalark, Ark., reported burned, will be rebuilt at once.

The Pierce Oil Corporation, Tulsa, Okla., will equip its refinery with apparatus to take off all burning oils, gasolines and naphthas from 7000 barrels of crude oil per day. The plant will cost \$600,000. Edward Fagan is the superintendent.

The mayor and city commissioner, Vicksburg, Miss., have ordered the completion of plans for a municipal waterworks plant by A. T. Dabney, Memphis, Tenn.

The Gibson Grocery Company, Ackerman, Miss., is reported in the market for equipment for an ice-making and refrigerating plant.

The Bowman-Hicks Lumber Company, Oakdale, La., will equip a lath mill in connection with its yellow pine plant.

S. A. Sutter, operating as the Ideal Cannery, will equip a canning plant at Jennings, La., and is in the market for the machinery, including power equipment.

Wofford Collins and J. M. McDonald, Ellisville, Miss., have plans for the equipment of a cannery to cost about \$10,000.

The Tylertown Light & Power Company, Tylertown, Miss., has plans for the installation of a 60-hp. engine and other equipment.

An ice plant of three to five-ton capacity will be

equipped at Ackerman, Miss., by T. B. Stanley, who is in the market for the machinery. He also wants bottling equipment.

A. T. Dabney, Memphis, Tenn., is the engineer for Vicksburg, Miss., in planning the construction of a new waterworks plant. The City Commissioners will decide on the details in the near future.

The Lake Charles Spoke & Handle Company, Lake Charles, La., will establish a plant. Adolph See and Edward See are officers of the company, which has begun the erection of buildings.

The Natalbany Lumber Company's mills at Natalbany, La., is reported burned with a loss of \$150,000, about one-third on equipment of planing mill and box factory.

A bottling works, ice plant and electric light plant are to be equipped at Logansport, La., by P. W. McKittrick, of Timpson, Texas, as a result of negotiations with the commercial club.

The Bowman-Hicks Lumber Company, Oakdale, La., is reported to be planning the installation of a lathe mill for working up yellow pine waste.

The Chickasaw Cooperage Company, Kilbourne, La., will install a sawmill to develop its timber holdings.

The Washitah Lumber Company, Morgan City, La., has been incorporated with a capital stock of \$100,000 by H. A. Waddell, Joseph Tavney and C. L. Waguespack, the last-named of Lockport, La., to engage in the lumber business, equipping mills, etc.

The Great Southern Lumber Company, Bogalusa, La., is reported to have plans for a mill of 300,000 ft. daily capacity at Mandeville, La.

The Nachitoches Lumber Company, Nachitoches, La., has been incorporated with a capital stock of \$30,000 by Paul M. and R. H. Potts and A. M. Russ, and will equip a mill.

The Jefferson-Plaquemines Drainage District, Geo. A. Haynes, Cotton Exchange, New Orleans, will install pumping equipment at Gretna, La. George A. Haynes, Cotton Exchange, New Orleans, La., is president.

The DeRidder Light & Power Company, DeRidder, La., has plans for the installation of a plant to cost about \$30,000.

The People's Light & Power Company, Logansport, La., will equip an electric light plant, the machinery to cost about \$8000. P. W. McKittrick is the manager.

The Link Newcomb & Hall Lumber Company has been incorporated with a capital stock of \$50,000 by W. H. Newcomb, St. Joseph, La., president; W. H. Hall, Jonesville, La., vice-president; M. T. Link, Benton, Miss., secretary, and plans to equip a mill.

The Botany Bay Lumber Company, Thibodeaux, La., has been incorporated with a capital stock of \$50,000 by Frank M. Pritchett, S. C. Frost and A. P. Breaux, and will equip a mill.

The Sewerage & Water Board of New Orleans, La., will receive bids until January 30 for electric and other equipment, including four 600 and seven 1200-hp. synchronous motors, one 1200-hp. induction motor, 11 50-kw. motor generators, 11 motor-driven vacuum pumps, six 1200, three 750 and one 450-kva. transformers, one 150-kw. rotary converter and a large amount of auxiliary apparatus. George E. Earl is general superintendent.

Ville Platte, La., has definitely decided to equip a waterworks plant to cost about \$15,000.

Birmingham

BIRMINGHAM, ALA., January 5, 1914.

Ward & Grimes, Pine Apple, Ala., will purchase lathes for the manufacture of handles. No power equipment will be needed, it is stated.

The H. H. Hitt Lumber Company, Decatur, Ala., suffered the loss of its planing mill at Falkville, Ala., by fire. It has not been announced whether the mill will be replaced.

Pooler, Ga., will spend \$6000, the proceeds of a bond issue, for waterworks.

A motor-driven pump will probably be purchased by the electric light commission of Madison, Ga. G. W. Hubbard is superintendent.

The Pynetree Paper Company has been organized

at Gordon, Ga., with a capital stock of \$50,000 by W. H. Gould, Hoboken, N. J.; T. C. Parker, Macon, Ga., and others, and has purchased the plant of the Georgia Pulp & Paper Company and will install a paper mill with a daily capacity of 50 tons.

The board of bond trustees, Jacksonville, Fla., will purchase electrical equipment. Bids will be received until January 15. Frank Richardson is chairman of the board.

The Planters Fertilizer & Livestock Company, Buena Vista, Fla., has been incorporated by J. L. Williams and others with a capital stock of \$5000. A fertilizer factory will be built.

A mill for the manufacture of excelsior is planned by M. G. Hoffman for installation at Pensacola, Fla.

The Commercial Union Assurance Company, Pensacola, Fla., is reported to be interested in the establishment of an iron foundry. Hooton & Watson are the company's agents.

W. T. Sauls, Bowling Green, Fla., will install a small electric light plant for the service of a few blocks in the business district.

Texas

AUSTIN, TEXAS, January 3, 1914.

The beginning of the new year was attended with little improvement in the machinery and tool trade. Business and industrial interests are holding back for the present, intending to renew activities when the season of 1914 is well under way. A number of extensive projects for road building have been announced, requiring much road-building machinery.

A new cotton gin, costing \$20,000, will be erected at Port Lavaca by H. F. Hollamon and J. J. Lesikar. The plant will have a daily capacity of 80 bales.

W. H. Scott is considering the erection of a large wax factory at Alpine. The proposed plant will employ about 200 men.

The factory mentioned last week, which the Texas Refining Company, Greenville, will erect at El Paso, will be used for the manufacture of lard compound and soap.

The car shops of the Southern Traction Company, at Trinity Heights, near Dallas, are rapidly nearing completion. The buildings will soon be finished and the work of installing the machinery started. J. F. Strickland is president of the company, which has added 122 miles of interurban track to its system in North Texas and expended \$7,000,000 on interurban lines, power plants and other works in the past year.

The Navasota Light & Power Company, Navasota, has increased its capital stock from \$20,000 to \$200,000, and changed its name to the Navasota Ice, Light & Power & Water Company. Extensive improvements and additions will be made to its light and power and waterworks plants.

C. C. Swanson, of Dallas, is planning the erection of a large brick plant at Port Arthur. The proposed plant will manufacture common brick, face and paving brick, tiling, roofing, etc.

The Bowie Light & Power Company, Bowie, has been incorporated with a capital stock of \$50,000 for the purpose of constructing an electric light and power plant at that place. The incorporators are Hiram Grosman, Mose Grosman and W. C. Woodlief.

The Lone Star Tool Company, Wichita Falls, has been organized with a capital stock of \$20,000 by C. E. Menzie, R. A. Painter and J. Markowitz.

The Yorktown Light & Ice Company, Yorktown, has been purchased by E. A. Clousnitzer, who will make extensive improvements to the electric light plant.

The Cuero Light & Power Company has been given a 50-year franchise by the city of Cuero and will enlarge and improve its plant. The company will build another dam near Cuero on the Guadalupe River to furnish more power.

The Nelson Mining Company will build a narrow gauge electric railroad from Crown King, near Prescott, Ariz., to its holdings about a mile distant. An electric power plant will be erected at Crown King. A 20-stamp mill will also be installed at the mines.

San Francisco

SAN FRANCISCO, CAL., December 31, 1913.

Few transactions are being closed this week, either in machine tools or general machinery, and new inquiries of any consequence are lacking. Government business, on which bids were submitted last summer, is still held in abeyance. Orders are expected shortly, however, from several old inquiries. Now that the banking interests understand the requirements to be met under the currency law, it is expected that money will be available to carry out work that has been held up for many months. Among dealers some doubt is expressed whether the improvement will affect them greatly within the next three or four months, but they are confident that next summer will bring unusual activity. Among the projects more or less definitely in view of the new year are several important additions to hydroelectric developments, and a few new plants, and a large amount of machinery will be required for the transmission and utilization of electric power. Municipal, state and Government harbor improvements will be an important factor, and there is some prospect of another large private drydock in this city. Requirements for state and county road construction will probably be larger than for 1913, and the outlook for new railroad construction is at least fair. Several important inquiries are appearing for mining equipment, which has been fairly active for some time.

The city of Oakland is making preliminary estimates for harbor improvements, the plan under consideration involving, in addition to extensive dredging and construction work, the installation of 344 cranes, estimated at \$9000 each.

The Western Pacific Railroad has agreed to spend \$1,000,000 in the next three years for the improvement of its portion of the Oakland water front.

The San Francisco office of the Orenstein-Arthur Koppel Company reports that 1913 has been the best year in the history of this office, the business of the last three months being especially satisfactory. This company has taken a contract for 7000 ft. of portable track and 13 standard dump cars for state highway work near Fresno, Cal., this being the tenth order of the kind taken for the state highway. It is estimated that only about one-third of the requirements of this work have been filled so far. Three carloads of portable track and two of dump cars have been sold for road work at Los Alamos, Cal.

The city of San Diego, Cal., is having plans drawn for a municipal repair shop.

The Distillate Motor Equipment Company, San Francisco, has been incorporated with a capital stock of \$100,000 by H. M. McDonald, W. W. McDonald and G. S. Bartlett.

Henry Bonetti, San José, Cal., has taken over the Goldy Machine Works, Sunnyvale, Cal., on a mortgage of \$22,304. The plant, built in 1904, is said to have cost \$212,000. It is announced that the plant will be put on the market.

Work has been started at Delano, Cal., on a new substation of the Mt. Whitney Power Company, equipment for which will amount to about \$14,000.

Within the next few months seven transformers of 400 kw. capacity each will be installed in a new substation of the Coast Counties Gas & Electric Company, at Hollister, Cal.

The Southern California Edison Company will begin construction in the spring on new hydroelectric plants on Bear and Santa Ana creeks, in the San Bernardino mountains.

The San Pedro Foundry & Machine Company, San Pedro, Cal., suffered about \$10,000 damage by fire in the foundry and pattern departments on December 22.

The Arizona Power & Water Company has been organized at Tucson, Ariz., to develop water power in Sabadía canyon.

L. Adolinda is preparing to build a flour mill near Elko, Nev.

The Red River Lumber Company has laid the foundations of its large mill at the new town of Westwood, near Susanville, Cal. The mill will have six bandsaws, with a daily output of 300,000 ft.

The Pacific Northwest

SEATTLE, WASH., December 29, 1913.

Prominent machinery dealers report business a shade heavier than that of last week. Several large orders, which might be construed as Christmas gifts, came to hand and the future looks promising. According to all reports business during the month of January will be brisk, as many of the mills and mines in this vicinity will make extensions and needed improvements. Orders for the necessary machinery are coming in slowly at this time. Collections are poor.

The commissioners of the Schneider Ditch District, Enterprise, Wash., near Bellingham, have decided to purchase a dredging machine.

The Pacific Brewing & Malting Company, Tacoma, Wash., will build an addition to its bottling works and will install some new machinery. It is reported about \$10,000 will be spent in the improvements. Plans for the work are being prepared by Architects Darmer & Cutting, 111 C street.

The Nitro-Development Company, Bellingham, Wash., recently made application to the United States Forestry Department, Washington, D. C., for permission to build three large hydro-chemical plants on the Upper Skagit River, where it plans to convert nitrogen extracted from the air into fertilizer.

The Pacific Pluto Paint Company, Seattle, has been incorporated with a capital stock of \$10,000. A plant for the manufacture of roofing and painting materials will be erected.

I. M. Morgan, Kelso, Wash., will build a large creamery in Oregon City, Ore.

The city of Umatilla, Ore., will shortly vote on the proposition of issuing bonds in the sum of \$20,000 to be used in the construction of a municipal water system. Louis C. Kelsey, consulting engineer, Selling Building, Portland, recently submitted plans and estimates of the proposed system which were approved by the Council.

The mill of the Pitchless Lumber Company, St. Johns, Ore., was recently totally destroyed by fire. Some insurance was carried, and it is understood the plant will be rebuilt at once.

The Port Commissioners, Astoria, Ore., recently instructed the engineers who are preparing plans for docks to be built by the port of Astoria to prepare plans for grain elevators which will be operated in conjunction with the municipally owned docks. Bids for materials and construction will be received shortly after the first of the year.

The Bend Lumber Company, Bend, Ore., will purchase engine and boiler room equipment in the near future to replace that which was recently destroyed by fire. Plans for new buildings are being prepared.

W. E. Frost, Priest River, Idaho, has made plans for the erection of a large lumber mill. Work will start either the latter part of the winter or early in the spring.

H. L. Fisher, Boise, Idaho, has in preparation plans for a 2500-acre irrigation project in Canyon County which will entail the construction of a pumping station.

Eastern Canada

TORONTO, ONT., January 5, 1914.

The Canada Foundry Company, Toronto, closed its foundry at the end of 1913, pending reorganization of the company.

The ratepayers of Hespeler, Ont., passed a bylaw to grant \$12,000 for an electric light plant.

The Sarnia Bridge Company, Sarnia, Ont., announces that it will make an extension to its plant, which will occupy about seven acres.

The Stewart Jam Company, Sarnia, Ont., will erect an addition to its plant to cost about \$15,000.

The Consumers' Fish & Cold Storage Company will erect a plant at Yarmouth, N. S.

Correcting an error in *The Iron Age* of December 18, to the effect that the shops of the Tillsonburg Electric Car Company, Ltd., Tillsonburg, Ont., would

shortly be reopened, it should be stated that they have not been closed.

It is announced that the Grand Falls Company, Ltd., St. John, N. B., will begin work soon on the erection of large pulp and paper mills at Grand Falls on the St. John River, where power can be developed. Sir William Van Horne is associated with this enterprise.

Basil Magor, vice-president of the National Steel Car Company, says that the company has received a couple of big contracts which will not only keep its own staff employed all winter, but will give work to other large industries. The company has an order from the Grand Trunk for 500 steel-frame stock cars and 10 steel-frame baggage cars; from the Pacific Great Eastern for 44 steel-box and 67 underframe steel flat cars, and from the Montreal & Southern Railway for 10 high-speed interurban electric cars.

W. C. Hawkins, managing director of the Dominion Power & Transmission Company, Hamilton, Ont., states that work on the construction of the new auxiliary power station to be built on the outskirts of Hamilton, Ont., will be begun shortly. It will develop 88,000 hp., and will cost \$3,500,000. Through this plant the company will be enabled to supply power all over its system. This will be one of the largest steam generated electric power plants on the continent.

The Canadian Mantel & Refrigerator Company, Ltd., Hamilton, Ont., has been incorporated with a capital stock of \$100,000 by Henry D. Petrie, Wilfred W. Currier and others of Hamilton, to manufacture grates, mantels, refrigerators, etc.

The French River Lumber Company, Ltd., Toronto, has been incorporated with a capital stock of \$40,000 by Alexander Mills, Frederick Irwin and others of Toronto, to engage in lumbering.

The Connolly-Agnew Construction Company, Ltd., Toronto, has been incorporated with a capital stock of \$40,000 by John F. Connolly, Thomas C. Agnew and others of Toronto, to construct sewers, sewage plants, water plants, etc.

The National Vending Machine Company, Ltd., Toronto, has been incorporated with a capital stock of \$100,000 by Mark V. Packard, Henry T. Stedman and others to manufacture vending machines.

The New Ontario Pressed Brick Company, Ltd., Sudbury, Ont., has been incorporated with a capital stock of \$150,000 by Chester A. Durkee, Elias T. Lansdowne and others of Sudbury, to manufacture tile, sewer pipe, etc.

The Victoriaville Bedding Company, Ltd., Victoriaville, Que., has been incorporated with a capital stock of \$150,000 by David H. Pennington, Quebec, Que., Joseph Z. Auger, and others, to manufacture furniture.

Boulter, Waugh, Ltd., Montreal, has been incorporated with a capital stock of \$400,000 by Daniel P. Gillmor, F. G. Bush, and others, to manufacture hats, caps, etc.

Sanibuild, Ltd., Montreal, has been incorporated with a capital stock of \$50,000 by C. J. E. Charbonneau, A. Blanchard, and others, to manufacture building material of wood, metal, etc.

The American Titanic Iron Company, Ltd., Quebec, Que., has been incorporated with a capital stock of \$1,000,000 by Simon N. Parent, of Ottawa, Ont., Eugene Roberge, Lambton, Que., and others, to manufacture and deal in iron, steel, etc.

The Pneuma Tubes, Ltd., Toronto, has been incorporated with a capital stock of \$1,000,000 by George H. Gray, William R. Willard, and others, to manufacture tubes, tires and other rubber goods.

J. E. McDonald, Ltd., Toronto, has been incorporated with a capital stock of \$40,000 by James E. McDonald, Tom Brown, Toronto, and others, to manufacture textile fabrics.

The Dart Cyclecar Company, Ltd., Toronto, has been incorporated with a capital stock of \$100,000 by Harry B. Smith, Frank M. Lorsch, Toronto, and others, to manufacture cyclecars and other power-driven vehicles.

The Sulphur Products, Ltd., Toronto, has been incorporated with a capital stock of \$150,000 by Vancouver C. Gordon, Thomas E. McCracken, of Toronto, and others, to manufacture chemical preparations.

The Canadian Oak Leather Company, Ltd., Brant-

ford, Ont., has been incorporated with a capital stock of \$100,000 by Percy S. Thornton, Eber E. Thornton, Brantford, Ont., and others, to manufacture leather, glue, etc.

The Kawneer Mfg. Company, Ltd., Toronto, has been incorporated with a capital stock of \$100,000 by Harry W. Page, R. W. R. Shearer, and others, of Toronto, to manufacture store fronts, moldings, etc.

Fraser & Chalmers, of Canada, Ltd., Montreal, has been incorporated with a capital stock of \$100,000 by John J. Creelman, Gilbert S. Stairs, and others, of Montreal, to manufacture mining machinery, etc.

The W. J. Inglis Company, Ltd., Montreal, has been incorporated with a capital stock of \$150,000 by Erastus E. Howard, Jacob DeWitt, and others, to manufacture woollens, worsteds, linen, etc.

The Russell-Jennings Mfg. Company, Ltd., St. Catharines, Ont., has been incorporated with a capital stock of \$50,000 by Arthur L. Jennings, Chester, Conn., James K. Kernahan, and others, to manufacture augers, auger bits, machinery, tools, etc.

The Wolthausen Hat Corporation, Ltd., Brockville, Ont., has been incorporated with a capital stock of \$1,000,000 by James S. Lovell, Charles D. Magee, and others, to manufacture hats, caps, etc.

The Begin Mfg. Company, Ltd., Victoriaville, Que., has been incorporated with a capital stock of \$49,000 by W. Begin, M. D., G. Begin, and others.

Western Canada

WINNIPEG, MAN., January 2, 1914.

The town of Duck Lake, Sask., has entered into an agreement with the Duck Lake Milling Company whereby the company will receive a free site of five acres and a cash bonus of \$3000. The company will establish a 300-bbl. mill.

J. B. Griffith, secretary-treasurer of the Edmonton Portland Cement Company, says that plans are being made to enlarge the 1500-bbl. plant at Marlboro, Alberta, by installing a fourth kiln with a capacity of 500 bbl. a day.

The Canadian Stewart Company has been awarded the contract for designing the new Government elevator at Port Nelson, B. C. Bids will be called in a few months.

A by-law was carried by the ratepayers of Davidson, Sask., to grant \$8500 for the purchase and installation of an electric light and power plant.

The Motor Cars & Supply Company, Ltd., Fort William, Ont., has been incorporated with a capital stock of \$40,000 by Horace W. Robinson, Frank F. Daglish and others to operate a machine shop and foundry.

The Melita Flour Mill Company, Ltd., Melita, Man., has been incorporated with a capital stock of \$100,000 by Arthur Schneider, of Winnipeg, George W. Archibald, of Melita, Man., and others.

The Canada Wood Preserving Company, Ltd., Winnipeg, Man., has been incorporated with a capital stock of \$10,000 by Walter Buekler, Walter S. Harris and others.

The Winnipeg Broom Mfg. Company, Ltd., Winnipeg, Man., has been incorporated with a capital stock of \$40,000 by Charles V. Alloway, Henry J. Horan and others.

The Good Roads Machinery Company, Winnipeg, Man., has been incorporated with a capital stock of \$200,000 by William E. Clark, James Smith and others.

The harbor commission of Vancouver, B. C., is considering the purchase of a floating crane for use in handling cargoes. The government wharves at that point will soon be equipped with heavy cargo-handling machinery.

A branch of the Carrhart Mfg. Company, Detroit, Mich., will be established in Astley Hall, Venables Street, Vancouver, B. C., early in 1914. The company will install electrical machinery for the manufacture of overalls, gloves, etc.

Theodore Hooper, architect, Winch Building, Vancouver, B. C., is preparing plans for factory buildings and wharf for the Royal Crown Soap Company, Vancouver, B. C. Bids for machinery, etc., will be received about February 1.

Trade Publications

Gears and Rolling Mill Pinions.—Mesta Machine Company, Pittsburgh, Pa. Bulletin K. Gives general description and specifications for machine molded and cut gears and pinions for power transmission. The gears listed include bevel, spur, worm and herringbone types. Views are given of a number of different gears, as well as the company's gear molding machine. The cut gears can be supplied up to 28 ft. in diameter and a face width of 6 ft. A number of views of the different stages in the manufacture of the cut gears are included.

Air Compressors.—Gardner Governor Company, Quincy, Ill. Circular A-C 6. Devoted to a line of horizontal duplex machines which consist practically of two single-cylinder self-oiling units placed side by side on a common base and coupled to one crankshaft with a single flywheel for both machines. Among the advantages claimed for this construction are that the cranks cannot stop on the dead center, as they are set at right angles and there are four compressions to every revolution. It is also possible in case of accident to run one side of the compressor and furnish at least a portion of the air required. A complete description of the compressor is given, the text being supplemented by engravings of the various parts. These machines can be supplied for either steam, belt or electric motor drive and views of the belt-driven and the steam-actuated compressors are given. A table of sizes and capacities is included.

Air Washers and Humidifiers.—Carrier Air Conditioning Company of America, 39 Cortlandt street, New York City. Catalogue No. 13. Describes and treats of the necessity and application of the three types of machine which are used for air washing, cooling and controlling of humidity in public or semi-public buildings, offices, etc. The principles of air washing design are gone into at some length, with a number of illustrations, followed by detailed descriptions of three different types of air washers. The company's automatic humidity control system for air washers is touched upon, and considerable information regarding the application of these devices is also included with numerous illustrations of actual installations. A number of tables of useful information are appended.

Rotary Vibrating Riveting Machine.—Grant Mfg. & Machine Company, Bridgeport, Conn. Circular. Calls attention to a rotary vibrating riveting machine, which was illustrated in *The Iron Age*, September 4, 1913. This machine is designed for use in close corners and in places which cannot be reached by a machine of the regular roll type. A brief description of the machine is given, together with an illustration and a condensed table of specifications.

Asbestos Roofing.—H. W. Johns-Manville Company, Madison avenue and Forty-first street, New York City. Pamphlet. Gives a general description of the various products of this company, together with specifications for the use of roofing and waterproofing. The text is supplemented by numerous engravings, showing the application of built-up and prepared roofing, asbestos shingles, waterproofing and mastic flooring, as well as views of a number of structures upon which they have been used.

Tool Steel.—Firth-Sterling Steel Company, McKeesport, Pa.; Wheelock, Lovejoy & Co., 23 Cliff street, New York City, agents. Catalogue. Illustrates and describes a number of different types of tool steels for lathe and planing and boring machine tools, drills, reamers, milling cutters, taps and dies, forming tools, chisels, mining drills and boiler shop, blacksmith and woodworking tools, etc. In this description the various purposes for which the different steels can be used are taken up and recommendations are made, showing what is being used in large shops. A chapter dealing with the making of this steel is included, as are also directions for heat treating the various grades and lists of extras and disks and drill rods that can be regularly supplied. Tables of weights and useful information, including a suggestion for the construction of a simple tempering forge, are included.

Electric Riveting Machines.—Eveland Engineering & Mfg. Company, 2324 Market street, Philadelphia, Pa.; Manning, Maxwell & Moore, Inc., 119 West Fortieth street, New York City, selling agent. Pamphlet. Pertains to a line of electric riveting machines which include semi-automatic power-driven machines, hand and foot power, bench, stationary, universal, double headed and portable machines. The classes of work for which these machines can be used are briefly touched upon, followed by instructions on the method of riveting. Cost data are included, together with a brief description of the testing laboratory of this company, which was illustrated in *The Iron Age*, May 15, 1913, and data on the amount of current required.

Boiler Furnaces.—Hawley Down Draft Furnace Company, Easton, Pa. Catalogue. Describes and illustrates the Hawley down draft furnace, which consists of a water tube

grate that is placed the same as an ordinary grate and on which the coal is fired. The special feature of this furnace is that the grate is piped up with the boiler and the water circulates through it and the piping, the flames passing downward instead of upward. The gases distilled from the coal by the heat are burned as they are driven off. Underneath this grate there is a second one to receive the spent fuel, and between these two is a furnace of high temperature in which all fuel, both solid and gaseous, is completely consumed before passing to the boiler. A complete description of this furnace is given, the text being supplemented by numerous engravings showing the application of the furnace to different types of boilers.

Reinforced Concrete Construction.—Turner Construction Company, 11 Broadway, New York City. Pamphlet. Points out that concrete buildings are economical of themselves as their cost is lower than that of any other form of fireproof construction. Practically all of the pamphlet is taken up with illustrations of representative reinforced concrete industrial buildings which this company has constructed, a brief description of each operation being given. The structures shown include factory, warehouse and loft buildings, all of which have been erected at an approximate cost of 10c. per cu. ft. of contents.

Elevating Trucks.—Cowan Truck Company, Holyoke, Mass. Folder entitled the "Transveyor News." Relates to the use of the Cowan transveyor in a number of different plants and shows the uses that have been made of it. A feature of the folder is a series of questions as to what the machine is and how it can be used, with answers. In a number of cases the answers to the questions are supplemented by views showing the truck in use in industrial plants.

Sheet Metal Working Machinery.—American Can Company, Machinery Sales Department, 104 South Michigan avenue, Chicago, Ill. Catalogue. Illustrations and descriptive matter explain the operation of an extensive line of sheet metal working machinery, which includes punch presses of the open back inclinable type with various depths of throat, solid back, straight sided, double crank, hand and power, screw and toggle embossing presses and gang slitting machinery. In making up the catalogue a general description is given of each general type of machine, followed by engravings with brief descriptions of the several different ones. At the end of each of these divisions of the catalogue a table of specifications for the different sizes is given.

Calendar.—L. B. Flanders Machine Works, H. B. Underwood & Co., 1025 Hamilton street, Philadelphia, Pa. Wall hanger. Size, 20 x 27 in. Contains a complete calendar for December, 1913, and the entire year of 1914. In addition to making a general announcement of the various machines built by this firm the separate leaves of the calendar contain reproductions of different portable machine and repair shop tools manufactured.

Sandpaper.—Herman Behr & Co., Inc., 75 Beekman street, New York City. Catalogue. Treats of various lines of sandpaper and emery cloth, and is said to be the first catalogue ever gotten out that deals only with sandpaper. Various grades of paper using garnet or flint as the abrasive are illustrated and briefly described. Brief instructions are given on the use of these papers in machines of various types for finishing wood and metal, and mention is also made of a line of abrasive disks. The cover of the catalogue is a sheet of the company's garnet paper.

Electric Furnaces.—Hoskins Mfg. Company, 453 Lawton avenue, Detroit, Mich. Bulletin No. 8. Covers a line of electric furnaces and describes their construction, operation and use. These furnaces have a heating element of nickel chromium and are intended to provide a high temperature and accurately controllable heat for industrial uses. The text of the bulletin is supplemented by numerous engravings, showing the furnaces in use, giving various connection diagrams and illustrations of the different types of furnace which can be supplied with either muffle, tube or crucible chambers. Some of the uses to which these furnaces are put are briefly described in the bulletin.

Indicator and Power Counter.—Herman Bacharach, 1009 Hartje Building, Pittsburgh, Pa. Pamphlet. Illustrates and describes a patent indicator of the type described in *The Iron Age*, August 15, 1912, which has been fitted with a power counter that gives the mean indicated horsepower of any reciprocating unit instantaneously. In this way it is possible to eliminate the use of the planimeter in figuring the horsepower from indicator diagrams. The apparatus indicates every stroke of the engine, and in use it is simply necessary to note the reading on the counting appliance at any given moment and multiply it by constants for the apparatus and the engine. A description of the counting appliance and instructions for its use are given and several diagrams showing the accuracy of this indicator as compared with the ordinary planimeter method are included.